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Artificially Intelligent Copyright: Rethinking Copyright Boundaries

Aviv Hertzel Gaon
Osgoode Hall Law School of York University

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Aviv-Hertzel Gaon

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Abstract

My dissertation explores the legal boundaries of copyright law in the wake of artificial intelligence (AI) technology. In building the theoretical foundations for my dissertation, I go through several key phases. First, I highlight important historical events and milestones in AI. I further develop the philosophical debate on AI legal personhood and deliberate whether we are approaching a "singularity" – the next stage of AI evolution. I also explore the concept of AI as it matured through the years.

In the second part, I theorize how AI can be regarded as an author under IP normative standards. Part of accepting the argument that AI deserve copyright is a willingness to change the perception that only human creations are worthy of copyright protection. I also seek an answer to two sub-questions – the "who" and the "what". The "who" considers the normative standards of authorship in the ongoing struggle between an author's right and the public domain. The "what" raise the originality debate and discusses the standard of creation.

In the third part, I outline the many "candidates" for AI authorship – the programmer, the user, the AI and an alternative legal framework for AI's ownership like the public domain or author-in-law. Finally, I discuss the outcomes of each model and provide my conclusions.

Acknowledgments

Undertaking a Ph.D. degree is like walking in the jungle. You might be fortunate enough to have a decent map and a compass, but without guidance, you are most likely to get lost. I was not. During my journey, I had many teachers and mentors who guided me, carefully and patiently, through the intellectual property maze.

First, I wish to thank my supervisor, Giuseppina D'Agostino, the founder and director of IP Osgoode. From the moment we met, Professor D'Agostino encouraged me to develop my ideas, which at the time seemed irrelevant and maybe even preposterous to many. However, Professor D'Agostino realized the potential artificial intelligence could have on intellectual property law, and my abstract ideas materialized under her guidance.

I was also very fortunate to have David Vaver and Lior Zemer as members of my supervisory committee. I benefit greatly from their wisdom, both theoretically and doctrinally.

I first met Professor Vaver at a conference I had organized in Israel with Professor Zemer in 2014. Professor Vaver's talk during that conference inspired me and planted the seed for my doctorate studies the following year. I am thankful to Professor Vaver for his support, feedback, and for being an inspiration for many IP scholars around the world such as me. I hope I have earned my place in Professor Vaver's club now.

I would have never dreamed of pursuing a Ph.D. degree if not to Professor Lior Zemer. I owe Lior a debt of gratitude for pushing and stirring me in the right direction. I am happy to discharge some of this debt now. From the moment I met Professor Zemer, I felt his passion for law while sitting in the first row of his first course on Jurisprudence at IDC Herzliya in 2006. More than a decade later, I can say he managed to pass his passion on to me, and I would forever be grateful for this and for all he has done for me.

I found Osgoode Hall Law School to be an intellectually fertile place and enjoyed the opportunities and support I received from Benjamin Geva, Lorne Sossin, Shelley Kierstead, Dan Priel, and Fred and Joyce Zemans. I remember Dean Sossin's remarks (and glooming warning) on my first day at Osgoode (if memory serves) that a Ph.D. program is a very lonely one. I thank the many people mentioned here for proving Dean Sossin wrong.

And I will always treasure my many friends and colleagues who made my journey a very pleasant one. Special thanks go out to my partner in crime(s) – Ian Stedman – who went on with most of my crazy ideas. Ian, you have been a terrific friend and colleague. I am also grateful to Tamera Burnett, Suzanne Chiodo, Matthew Dylag, Amit Elazari Bar On, Jordan Fine, Ung Shen Goh, Bob Tarantino and many more.

As a member of IP Osgoode, I had the opportunity to work alongside many great people at Osgoode and other institutions while organizing conferences and events that contributed to the vibrant discussions that IP Osgoode facilitates. In all those endeavours Michelle Li was – and still is – an absolute force. I could not have imagined a more capable or supportive person to work alongside in order to make all our innovative ideas come to life. I thank Michelle for both her support and her friendship.

My dissertation is also the tipping point in my legal education, to which many have contributed. I would like to mention a few: Professor Amnon Rubinstein, who gave me excellent advice and support throughout the years. Ronen Kritenshtein, who is a role model for me in regard to academic and legal practice excellence. Aharon Barak, Dov Greenbaum, Justice Asher Grunis, Liav Orgad, Sharon Rabin-Margalioth, Hillel Somer and many other mentors and brilliant legal scholars that nurtured me as a student. And I owe Sharon Pardo a debt of gratitude for sharing his academic wisdom and experience with me.

I also wish to thank Mrs. Nina Weiner, ISEF Foundation Chairwoman Emerita and ISEF for their continuing support of my research.

Last, but not least, I thank the Canadian branch of my family who opened their homes and hearts for me during these challenging times and helped me cope with the weather and my longing for Israeli food. Freda, Arthur, Zak and Noam Muscovitch, I would always cherish the time we shared together.

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PART I: SEARCHING FOR COMMON GROUND: CONCEPTUALIZING AI

"I never think about the future – it comes soon enough." (Albert Einstein)

1.1 INTRODUCTION

Technology and its interactions with humans have long captivated writers.[1] An extensive and wide-ranging literature has covered artificial intelligence (AI) technology in the fields of computer science,[2] philosophy,[3] economy,[4] religion,[5] ethics[6] and science-fiction.[7] Indeed, the AI debate encompasses a variety of technical, scientific and legal issues.[8]

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[1] Nils J Nilsson, *The Quest for Artificial Intelligence: A History of Ideas and Achievements* (Cambridge University Press, 2010) at 19, online (pdf): <ai.stanford.edu/~nilsson/QAI/qai.pdf>.

[2] Vincent C Müller, ed, *Fundamental Issues of Artificial Intelligence* (Switzerland: Springer International Publishing Switzerland, 2016) [Müller, "Fundamental Issues of AI"]; Vincent C Müller, ed, *Philosophy and Theory of Artificial Intelligence* (Springer-Velrag Berlin Heidelberg, 2013) [Müller, "Philosophy and Theory of AI"].

[3] Aristotle wrote: "For suppose that every tool we had could perform its function, either at our bidding or itself perceiving the need ... of which the poet says that 'self-moved they enter the assembly of gods' – and suppose that shuttles in a loom could fly to and fro[m] and a plucker play a lyre all self-moved, then manufacturers would have no need of workers nor masters of slaves." Aristotle, *The Politics*, translated by T A Sinclair (Harmondsworth: Penguin, 1962) at 31. Thomas Hobbes referred in *Leviathan* to an artificial animal, stating: "NATURE … is by the *Art* of man, as in many other things, so in this also imitated, that it can make an Artificial Animal. For seeing life is but a motion of Limbs, the beginning whereof is in some principall part within; why may we not say, that all *Automata* (Engines that move themselves by springs and wheels as doth a watch) have an artificial life? For what is the *Heart* but a *Spring*; and the *Nerves* but so many *Strings*; and the *Joynts* but so many *Wheels*, giving motion to the whole Body, such as was intended by the Artificer? *Art* goes yet further, imitating that Rational and most excellent worke of Nature, *Man*." Thomas Hobbes, *Leviathan*, ed by C B Macpherson (Harmondsworth: Penguin, 1968) at 81. Nilsson stated that the science historian, George Dyson, has referred to Hobbes as the patriarch of AI. Nilsson, *supra* note 1 at 21; See also Pamela McCorduck, *Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence* (W H Freeman and Company, 1979) at 3-29. Pamela McCorduck is one of the leading AI historians. In her book she outlined the history of AI and machine intelligence.

[4] US, Executive Office of the President, *Artificial Intelligence, Automation, and the Economy* (2016), online (pdf): <obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/Artificial-Intelligence-Automation-Economy.PDF> [AI & the Economy White Paper].

[5] Jewish folklore contains stories about an animated anthropomorphic being that was created from clay or mud, called *Golem*. The most famous Golem story is about the *Golem of Prague*. The Maharal (Judah Loew ben Bezalel) is said to have created the Golem in the late 16th century to defend the Jewish ghetto from anti-Semitism. See Nathan Ausubel, ed, *A Treasury of Jewish Folklore* (Crown Publishers Inc, 1948) at 605, online (pdf): <http://www.bibleandjewishstudies.net/stories/The_Golem_of_Prague.pdf>. See also McCorduck, *supra* note 3 at 12-13.

[6] Patrick Lin, Keith Abney & Ryan Jenkins, eds, *Robot Ethics 2.0: From Autonomous Cars to Artificial Intelligence* (Oxford University Press, 2017); Nick Bostrom & Eliezer Yudkowsky, "The Ethics of Artificial Intelligence" in Keith Frankish & William M Ramsey, eds, *The Cambridge Handbook of Artificial Intelligence* (Cambridge University Press, 2014) at 316-334; Burkhard Schafer et al, "A Fourth Law of Robotics?: Copyright and the Law and Ethics of Machine Co-Production" (2015) 23:3 AI & L 217 [A Fourth Law of Robotics]; See also Stuart Russell & Peter Norvig, eds, *Artificial Intelligence A Modern Approach*, 3rd ed (Prentice Hall, 2010) at 1034-1040. Recently, the EU Commission for the Efficiency of Justice has adopted ethical principles relating to the use of AI in judicial systems. These principles include ensuring compatibility of the design and implementation of AI systems with fundamental rights, preventing discrimination and bias, making data processing methods accessible and transparent, *etc*. See CEPEJ, *European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and their Environment, 3 December 2018* [2018].

In *The Path of Law*,[9] Justice Oliver Wendell Holmes proclaims that "the development of our law has gone on for nearly a thousand years, like the development of a plant, each generation taking the inevitable next step, mind, like matter, simply obeying a law of spontaneous growth."[10] Holmes' pragmatic approach accepts the general idea of the law as a mechanism for mediating social interactions. Hence, as Jack Balkin suggests, "When we consider how a new technology

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[7] Science fiction has contributed tremendously to human perceptions about AI. Star Trek: The Next Generation, for example, introduced the AI humanoid robot *Data*. Data is in a constant search for his humanity, and throughout the series (and movies) we realize how Data has evolved to become an equal member of the Enterprise (starship) crew. See the interesting discussion during Data's "trial" – Star Trek: The Next Generation, "The Measure of a Man" (13 February 1989), online (video): *YouTube* <www.youtube.com/watch?v=bJF-IRbTh0Q>. Another example is the phenomenal HBO series Westworld. Westworld is an amusement park populated by synthetic androids called "hosts". During the first season we learn about the hosts' thoughts and development. Several interesting discussions challenge human perception, see the dialog between Bernard and Dr. Robert Ford (portrayed by Anthony Hopkins) about consciousness, Westworld, "Trace Decay" (20 November 2016), online (video): *YouTube* <www.youtube.com/watch?v=S94ETUiMZwQ>. Science fiction has also been driven by the fear from potential AI catastrophes. In the film *The Terminator* (1984), an AI entity known as *Skynet* becomes self-aware, decides that humanity poses a threat to its existence, and seeks to exterminate the human race in order to fulfill its original purpose. See the recent *Terminator* opening scene, *Terminator Genisys* (22 June 2015), online (video): *YouTube* <www.youtube.com/watch?v=3iMvFMMrNkA>. I should also indicate two important movies in the field of AI as well: *Ex Machina* (2015) and *Her* (2013). Examples in the science fiction literature abound as well. Isaac Asimov is considered an AI visionary. His book *I, Robot* (Random House Publishing Group, 2004) consists of nine stories about robots that are very different from the common robot stories of the time. Asimov's robots are not destructive by nature. He is also known for *Asimov's rules of robotics*. First Law: A robot may not injure a human being, or, through inaction, allow a human being to come to harm. Second Law: A robot must obey the orders given to it by human beings except where such orders would conflict with the First Law. Third Law: A robot must protect its own existence as long as such protection does not conflict with the First or Second Law. In later work, *Robots and Empire* (Doubleday Books, 1985), Asimov added a Fourth Law (also known as the Zeroth Law): A robot may not injure humanity or, through inaction, allow humanity to come to harm. These examples reflect more than anything else the human fixation with AI.

[8] Yuval Noah Harari, *21 Lessons for the 21st Century* (Penguin Random House Canada, 2018); See also Jean-Gabriel Castel & Matthew E Castel, "The Road to Artificial Intelligence: Has International Law a Role to Play?" (2016) 14 CJLT 1 [J G Castel & M Castel] (on the existential threat that AI poses to humanity); Fundamental Issues of AI, *supra* note 2 (discusses fundamental issues regarding present and future AI from the perspectives of cognitive science, computer science, neuroscience, and philosophy); "Focus Feature: Artificial Intelligence, Big Data, and the Future of Law" (2016) 66 UTLJ 423 (the authors argue, in four different articles, that future machines will develop capabilities and perform many of the tasks currently performed by the legal community today); Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* (Oxford: Oxford University Press, 2014) (the author explores what will happen to humanity when machines surpass human intelligence); Kevin Kelly, *What Technology Wants* (Viking, 2010) (Kelly offers insights for the behaviour of technology as a natural system); Philosophy and Theory of AI, *supra* note 2; Russell & Norvig, *supra* note 6; Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (Penguin, 2005) (leading the singularity debate); McCorduck, *supra* note 3.

[9] Oliver Wendell Holmes Jr, "The Path of Law" (1897) 10 Harv L Rev 457.

[10] *Ibid* at 468.

affects law, our focus should not be on what is *essential* about the technology but on what features of social life the technology makes newly *salient*."[11]

In the coming decades, humanity will be forced to address new social issues induced by scientific progress. It is reasonable to assume that these changes will affect social interactions and, subsequently, the development of our legal norms.[12] As James Boyle articulates: "Both the definition of legal persons, and the rights accorded to those persons, have changed over time … Progress may have been gradual, intermittent or savagely resisted by force. There may have been back-sliding. But in the end the phrase 'all men' actually came to mean *all* men, and women too."[13] Indeed, when "our world fills with robotic and AI technologies, our lives and relationships of social, political, and economic power will also change, posing new and unexpected challenges for law."[14] The phenomena of the Internet and smartphones have taught us that we cannot predict

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[11] Jack M Balkin, "The Path of Robotics Law" (2015) 6 CALRC 45 at 46. See also Ryan Calo, "Robotics and the Lessons of Cyberlaw" (2015) 103 Cal L Rev 513. Calo and Balkin contemplate on the benefits and challenges robots and AI technology will bring.

[12] In "The Path of Law: Towards Legal Singularity" (2016) 66 UTLJ 443, Benjamin Alarie coined the term "legal singularity." Alarie offers, *ibid* at 445, that "we can be confident that technological development over the course of this century will lead to (a) a significantly greater quantification of observable phenomena in the world ('more data') and (b) more accurate pattern recognition using new technologies and methods ('better inference') … The culmination of these trends will be what I shall term the 'legal singularity'." According to Alarie, *ibid* at 446, "[t]he legal singularity contemplates the elimination of legal uncertainty and the emergence of a seamless legal order, which is universally accessible in real time. In the legal singularity, disputes over the legal significance of agreed facts will be rare. There may be disputes over facts, but, once found, the facts will map onto clear." In the second paper, "Self Driving Laws" (2016) 66 UTLJ 429 at 430, Anthony J Casey & Anthony Niblett claim that "law will exist in a catalogue of precisely tailored directives, specifying exactly what is permissible in every unique situation." See also Anthony Casey & Anthony Niblett, "The Death of Rules and Standards" (2017) 92:4 Ind L Rev 1401; Frank Pasquale & Glyn Cashwell, "Four Futures of Legal Automation" (2015) 63 UCLA L Rev 26; Jesse Beatson, "AI-Supported Adjudicators: Should Artificial Intelligence Have a Role in Tribunal Adjudication?" (2018) 31 CJALP 307. Brian Sheppard discusses how technology developments could change "essential features" of our legal system and norms. See Brian Sheppard, "Warming Up to Inscrutability: How Technology Could Challenge Our Concept of Law" (2018) 68:1 UTLJ 36.

[13] James Boyle, *Endowed by Their Creator? The Future of Constitutional Personhood* (Brookings, 2011) at 7, online (pdf): <www.brookings.edu/wp-content/uploads/2016/06/0309_personhood_boyle.pdf>. See also Jeffrey Rosen & Benjamin Wittes, eds, *Constitution 3.0: Freedom and Technological Change* (Brookings, 2011). I should clarify that, even if the normative conclusion leads to recognising legal rights for AI, this does not necessarily mean that AI will earn the same rights as humans. For example, I do not believe that AI rights are to be bestowed "naturally" upon creation.

[14] Balkin, *supra* note 11 at 49. See also Andrew J Wu, "From Video Games to Artificial Intelligence: Assigning Copyright Ownership to Works Generated by Increasingly Sophisticated Computer Programs" (1997) 25 AIPLA QJ 131.

technological effects on our laws and norms, while many expected changes turn out to be insignificant.[15] Further, as Balkin opines, "The characteristics of a new technology, in short, are partly the product of current use and partly the work of human imagination about potential affordances and opportunities, dangers and threats."[16] Balkin claims that the law will resort to legal fictions in the face of difficulties and "substitute robot for human to allow the law to function effectively in the face of the legal enigmas posed by emergent behaviour. Or we might adopt legal fictions to keep existing legal doctrines working provisionally until we can produce more thorough and coherent reforms."[17]

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[15] In 1991, for example, the World Wide Web's "essential features were its abilities to cross jurisdictional lines at will, to send digital information quickly and cheaply, and to facilitate anonymous communication." However, by 1999 "it was clearer that states could control features of the Internet traffic and that the degree of truly anonymous communication the Internet afforded was overstated." Balkin, *supra* note 11 at 47.
[16] *Ibid*.
[17] *Ibid* at 58. As Boyle, *supra* note 13 at 17, indicated, Legal fictitious are not absent from law – "corporations are artificial entities and yet we have chosen to classify them as legal persons to which many constitutional rights adhere."

For many, the AI future is bright and promising. Predictions about future applications of AI-based technology fill our books, academic papers, and news. Think about the prospects of caregivers' robots for the elderly, nanny-bots for infants or the promise of AI doctors,[18] psychologies,[19] lawyers,[20] drivers,[21] *etc*. Indeed, AI technology is affecting transportation,[22] home services,[23] healthcare,[24] education,[25] public safety,[26] employment and businesses,[27] food production and productivity,[28] investment and finance,[29] entertainment,[30] government services,[31] journalism,[32] and may even provide an alternative to human interaction.[33]

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[18] See e.g. Parmy Olson, "This AI Just Beat Human Doctors On A Clinical Exam" (28 June 2018), online: *Forbes* <forbes.com/sites/parmyolson/2018/06/28/ai-doctors-exam-babylon-health/#63b1b1e312c0>.

[19] Sam Shed, "Apple is hiring a counsellor to help Siri have 'serious conversations'" (15 September 2017), online: *Business Insider* <uk.businessinsider.com/apple-is-hiring-a-psychologist-to-help-siri-have-serious-conversations-2017-9>.

[20] The Legal-Tech industry provides a variety of research tools and services that could enhance lawyer's work significantly. Codex classified legal technologies into nine groups: marketplace, document automation, practice management, legal research, legal education, online dispute resolution, e-discovery, analytics, and compliance. Recently, Ontario Superior Court capped the costs awarded in a liability case stating that "[i]f artificial intelligence sources were employed, no doubt counsel's preparation time would have been significantly reduced." *Cass v 1410088 Ontario In*, 2018 ONSC 6959. The Superior Court decision is interesting giving the possible impact on practicing lawyers that would require to use AI legal search engines to save costs. See also Benjamin Alarie, Anthony Niblett & Albert H Yoon, "Law in the Future" (2016) 66:4 UTLJ 423; Beverley McLachlin, "The Legal Profession in the 21st Century" (Remarks delivered at the 2015 Canadian Bar Association Plenary, Calgary, 14 August 2015); Chris Johnson, "Leveraging Technology to Deliver Legal Services" (2009) 23 Harv JL & Tech 259; Bernard Marr, "How AI And Machine Learning Are Transforming Law Firms And The Legal Sector" (23 May 2018), online: *Forbes* <forbes.com/sites/bernardmarr/2018/05/23/how-ai-and-machine-learning-are-transforming-law-firms-and-the-legal-sector/#605ba3ab32c3>; Dan Mangan, "Lawyers could be the next profession to be replaced by computers" (17 February 2017), online: *CNBC News* <cnbc.com/2017/02/17/lawyers-could-be-replaced-by-artificial-intelligence.html>.

[21] There is an abundance of information concerning self-driving cars. See e.g. online: *The Guardian* recent reports from November and October 2018 <www.theguardian.com/technology/self-driving-cars>. See also Harari, *supra* note 8, chapter 2 "work".

[22] Nevada passed legislation to authorize the use of driver-assistive platooning technology and the use of a fully autonomous vehicle to provide transportation services. See US, AB 69, *An Act Relating to Transportation*, 2017, Sen Assem, Nev 2017. See also recent discussions regarding self-driving legislation at the US, *HR*, *Self-Driving Vehicle Legislation: Hearing Before the Subcommittee on Digital Commerce and Consumer Protection*, 115 Cong (2017), online: <energycommerce.house.gov/hearings/self-driving-vehicle-legislation>. On the Federal level, see US, Department of Transportation, *Automated Driving Systems 2.0 A Vision for Safety* (2017), online (pdf): <nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf>. According to the 100 Year Study "[t]ransportation is likely to be one of the first domains in which the general public will be asked to trust the reliability and safety of an AI system for a critical task", Peter Stone et al, *Artificial Intelligence and Life in 2030 - One Hundred Year Study on Artificial Intelligence: Report of the 2015-2016 Study Panel* (Stanford University Press, 2016) at 18, online (pdf): <ai100.stanford.edu/2016-report> [The 100 Year Study]. The 100 Year Study is the first in a planned series of studies on AI. The purpose of the study is "to provide a collected and connected set of reflections about AI and its influences as the field advances." *Ibid* at 1. In Australia, a recent policy paper by the National Transport Commission outline possible legislation changes concerning automated and self-driving cars, AUS, National Transport Commission, *Changing Driving Laws to Support Automated Vehicles* (2017), online (pdf):

<ntc.gov.au/Media/Reports/(E5695ACE-993C-618F-46E1-A876391B8CD9).pdf>. See also Noah Zon & Sara Ditta, *Robot, Take the Wheel: Public Policy for Automated Vehicles* (Mowat Research Publications, 2016) at 118; Janet Fleetwood, "Public Health, Ethics, and Autonomous Vehicles" (2017) 107 AJPH 532; Patrick Lin, "Why Ethics Matter for Autonomous Cars" in Markus Maurer, J, eds, *Autonomous Driving: Technical, Legal and Social Aspects* (Springer, 2016) at 69-85. MIT Moral Machine experiment can highlight, in a very vivid way, the dilemmas that engineers are facing in designing automated/self-driving cars, see <moralmachine.mit.edu>.

[23] In the next decade (or even before), caregiver's robots and other automated systems/AIs would be able to take over a great load of our work at home and the office: "Special purpose robots will deliver packages, clean offices, and enhance security, but technical constraints and the high costs of reliable mechanical devices will continue to limit commercial opportunities to narrowly defined applications for the foreseeable future." The 100 Year Study, *ibid* at 24.

[24] I Glenn Cohen, Holly Fernandez Lynch & Effy Vayena, eds*, Big Data, Health Law, and Bioethics* (Cambridge University Press, 2018); Daniel Akst, "Computers Turn Medical Sleuths and Identify Skin Cancer" (10 February 2017), online: *The Wall Street Journal* <wsj.com/articles/computers-turn-medical-sleuths-and-identify-skin-cancer-1486740634>; See also the 100 Year Study, *supra* note 22 at 25. AI-based systems can provide a better and most accurate diagnostic while AI robots can change the clinical setting replacing humans as surgeons. In China, for example, a robot dentist performed the first successful autonomous implant surgery recently. See Alice Yan, "Dentists in China Successfully Used a Robot to Perform Implant Surgery Without Human Intervention" (1 September 2017), online: *Business Insider* <businessinsider.com/dentists-in-china-used-a-robot-to-perform-implant-surgery-2017-9>. For a futuristic example, see the short clip from *Elysium* (7 August 2013), online (video): *YouTube* <youtube.com/watch?v=RyMoJHf7rCQ>.

[25] AI promise to change our education system as well. Though, as the 100 Year Study have indicated, *ibid* at 31, "computer-based learning systems are not likely to fully replace human teaching in schools," AI technologies will probably play an important role as an assistant tool for teachers and university professors. Even today, the use of Intelligent Tutoring Systems (ITS) applications in US high schools, universities and the military is growing. Students, teachers and professors are getting used to online and other technological services. Recently, Osgoode Hall Law School and the Faculty of Computer Science at the University of Waterloo, have offered an online course – *Advanced Research Topics: Artificial Intelligence: Law, Ethics, and Policy* – in which the lecturer used a video conference interface to broadcast the seminar from Waterloo to Toronto. I assume that in the future universities will offer more interactive courses, which in turn will allow more people access to high education. Furthermore, other advantages in technology will enhance the learning experience and effectively more students/users will prefer the online self-learning opportunities over the orthodox teaching methods. One possibility is using virtual and augmented reality-based technology. The future opportunities that AI presents in education probably will have a positive effect in third world countries as well.

[26] Deploying AI based technology to improve safety in cities has both positive and negative implications on our day to day life. Take surveillance cameras for example. Using AI and machine-learning capabilities can improve the chances of detecting crime and potential dangers (including terror activates) before posing any risk. AI systems would be able to identify if someone is expressing tension or odd behaviour and dispatch law enforcement agencies to prevent the crime. On the other hand, we might lose the minimal privacy we have left with making us all "naked" to the world. There are several successful examples of using AI to detect and prevent Cybercrime. See Shannon Bond, "Artificial Intelligence and Quantum Computing Aid Cyber Crime Fight" (24 May 2017), online: *Financial Times* <ft.com/content/1b9bdc4c-2422-11e7-a34a-538b4cb30025>.

[27] As the 100 Year Study, *supra* note 22 at 39, states "[t]he economic effects of AI on cognitive human jobs will be analogous to the effects of automation and robotics on humans in manufacturing jobs. Many middle-aged workers have lost well-paying factory jobs and the socio-economic status in family and society that traditionally went with such jobs. However, at the end these changes might eventually create more work and raise the economic value of a certain field." Spyros Makridakis shares these views arguing that "[t]he expected changes being brought by AI technologies will be just as, or even more significant as those of the Industrial revolution and much harder to predict." See Spyros Makridakis, "The Forthcoming Artificial Intelligence (AI) Revolution: Its Impact on Society and Firms" (2017) 90 Futures 46 at 53. AI might also influence the location and size of the workforce making certain jobs in the organization done by AI and effectively hire few people. Managing the workforce can also be done by an AI and from a virtual office (saving the cost of maintaining offices). See also "Artificial intelligence will create new kinds of work" (26 August 2017), online: *The Economist* <economist.com/news/business/21727093-humans-will-supply-digital-services-complement-ai-artificial-intelligence-will-create-new?fsrc=scn/fb/te/bl/ed/artificialintelligencewillcreatenewkindsofwork>; Harari, *supra* note 8, chapter 2. Several people have expressed concern about high unemployment rates. See, e.g. Michael A Peters, "Technological Unemployment: Educating for the Fourth Industrial Revolution" (2017) 5:1 Journal of Self-Governance and Management Economics 25; John Barnett, "Will AI Revolution Lead to Mass Unemployment?" (24 April 2017), online: *Business* <business.com/articles/john-barnett-artificial-intelligence-job-market>. However, as Mark Lemley answers rhetorically: "What will people do when they no longer have to work to produce the goods and services they need and want? I don't know. But I am doubtful the answer is 'nothing'." see Mark Lemley, "IP in a World Without Scarcity" (2015) 90 NYU L Rev 460 at 513 [Lemley, IP in a World Without Scarcity].

[28] The World Economic Forum argues that new technology, AI included, "can create significant new value through innovations for food systems." See World Economic Forum, *Shaping the Future of Global Food Systems: A Scenarios Analysis* (2017) at 22, online (pdf): <www3.weforum.org/docs/IP/2016/NVA/WEF_FSA_FutureofGlobalFoodSystems.pdf>; A T Kearney, *Technology and Innovation for the Future of Production: Accelerating Value Creation* (World Economic Forum, 2017), online (pdf): <www3.weforum.org/docs/WEF_White_Paper_Technology_Innovation_Future_of_Production_2017.pdf>. Forbes offer several AI implications on improving agriculture (AgTech) such as automated harvesting and image recognition systems that can detect plant's pests. See Rob Trice, "Can Artificial Intelligence Help Feed The World?" (5 September 2017), online: *Forbes* <forbes.com/sites/themixingbowl/2017/09/05/can-artificial-intelligence-help-feed-the-world/#1d8854e446db>. See recently, The Institute for Competitiveness & Prosperity, "From Prediction to Reality: Ontario's AI Opportunity" (2018), online (pdf): <competeprosper.ca/uploads/2018_From_prediction_to_reality_Ontarios__AI_opportunity.pdf> [Ontario's AI Opportunity Report].

[29] PWC has published a report assessing the impact of AI on the insurance industry. According to the report, AI is expected to improve efficiencies and automating existing underwriting and claims processes. See PWC, "Top Issues: AI in Insurance: Hype or Reality?" (2016), online (pdf): <pwc.com/us/en/insurance/publications/assets/pwc-top-issues-artificial-intelligence.pdf>. Banks and stock markets are using AI algorithms with prediction analysis for investments. See Matt Turner, "Machine Learning Is Now Used in Wall Street Dealmaking, and Bankers Should Probably Be Worried" (4 April 2017), online: *Business Insider* <www.businessinsider.com/jpmorgan-using-machine-learning-in-investment-banking-2017-4>. See also Martin Arnold & Laura Noonan, "Robots enter investment banks' trading floors'" (6 July 2017), online: *Financial Times* <www.ft.com/content/da7e3ec2-6246-11e7-8814-0ac7eb84e5f1>; Nizan Geslevich Packin & Yafit Lev-Aretz, "Big Data and Social Netbanks: Are You Ready to Replace Your Bank?" (2016) 53 Hous L Rev 1211.

[30] Makridakis, *supra* note 27 at 53, states the transition of the newspaper industry as an example to the change technology might have on the markets. It is difficult to predict how AI technology will affect the entertainment business. We can, however, suggest that it will not necessarily harm the industry by examining the effects of the Internet on the same business. Lemley, IP in a World Without Scarcity, *supra* note 27 at 487, explains that the Internet Revolution did not harm the entertainment industry, on the contrary "the overall industry grew from $449 billion in 1998 to $745 billion in 2010." See also Peter Menell & Ben Depoorter, "Using Fee Shifting to Promote Fair Use and Fair Licensing" (2014) 102 Cal L Rev 53. Virtual and augmented reality have great potential for the entertainment industry. See Mark Lemley & Eugene Volokh, "Law, Virtual Reality, and Augmented Reality" (2018) 166:5 Penn St L Rev 1051.

[31] Aviv Gaon & Ian Stedman, "A Call to Action: Moving Forward with the Governance of Artificial Intelligence in Canada", 56:4 Alta L Rev [forthcoming in 2019]. One example is using AI for decision making in processing immigration applications, see Teresa Wright, "Canada's Use of Artificial Intelligence in Immigration Could Lead to

Even the orthodox and conservative field of legal services have not escaped AI technology influence, to some extent.[34] In a recent book, Richard and Daniel Susskind argue for two possible scenarios for the future of professions in the age of AI: The first is a "more efficient version of what we already have today." The working force will remain relatively the same but will "heavily standardize and systemize their routine activities." The other scenario involves a "transformation in the way that expertise of professionals is made available in society." The Susskinds argue that "capable systems will … displace much of the work of traditional professionals."[35] These scholarly discussions might seem fruitless, given the current stage of AI; however, there are significant advancements in the commercial application of AI technology and, as several reports have indicated, AI is expected to affect many creative industries.[36]

Others view these expected developments as a real threat to humanity. The late theoretical physicist, Stephen Hawking, has stated that "success in creating AI would be the biggest event in human history. Unfortunately, it might also be the last."[37] Elon Musk shares Hawking's

Break of Human Rights: Study" (26 September 2018), online: *Global News* <globalnews.ca/news/4487724/canada-artificial-intelligence-human-rights>.

[32] Noam Lemelshtrich Latar observes that "within 5-10 years, the majority of all journalistic text stories will be written by robots." Noam L Latar, *Robot Journalism: Can Human Journalism Survive?* (World Scientific Publishing Co Pte Ltd, 2018) at 29.

[33] Sex robots for example. Ian Yeoman and Michelle Mars discuss the benefits of sex robots (mainly in the sex industry) and provide several scenarios for that future. See Ian Yeoman & Michelle Mars, "Robots, men and sex tourism" (2012) 44 Future 365. Will human "fall in love" with robots? See Noel Sharkey et al, "Our Sexual Future with Robots" (2017), online (pdf): <responsible-robotics-myxf6pn3xr.netdna-ssl.com/wp-content/uploads/2017/11/FRR-Consultation-Report-Our-Sexual-Future-with-robots-1-1.pdf>.

[34] See e.g. Beatson, *supra* note 12; Kevin D Ashley, *Artificial Intelligence and Legal Analytics: New Tools for Law Practice in the Digital Age* (Cambridge University Press, 2017); Lauren H Scholz, "Algorithmic Contracts" (2017) 20 Stan Tech L Rev 128; David A Larson, "Artificial Intelligence: Robots, Avatars, and the Demise of the Human Mediator" (2010) 25:1 Ohio St J Disp Resol 105.

[35] Richard Susskind & Daniel Susskind, *The Future of the Professions: How Technology Will Transform the Work of Human Experts* (Oxford: Oxford University Press, 2015) at 9.

[36] See e.g. Hasan Bakhshi, Carl B Frey & Michael Osborne, *Creativity Vs. Robots: The Creative Economy and the Future of Employment* (NESTA, 2015), online (pdf): <robots.ox.ac.uk/~mosb/public/pdf/1866/creativity_vs._robots_wv.pdf>.

[37] Stephen Hawking et al, "Stephen Hawking: 'Transcendence looks at the implications of artificial intelligence - but are we taking AI seriously enough?'" (1 May 2014), online: *The Independent* <independent.co.uk/news/science/stephen-hawking-transcendence-looks-at-the-implications-of-artificial-intelligence-but-are-we-taking-9313474.html>.

assessment, stating that if he had to guess what is humanity biggest risk, AI might be it.[38] Jean Gabriel Castel has predicted that when AI reaches the next stage of evolution (super-intelligence),[39] it will become the most powerful being on Earth.[40]

I do not share these ominous predictions. As the 100 Year Study suggests, with all the risks AI *might* pose to humanity it has a greater positive potential "to make driving safer, help children learn, and extend and enhance people's lives."[41] Nevertheless, we should embrace AI technology with caution, addressing the many legal, ethical and technological challenges posed by AI. As Ryan Calo recently offered, "[D]evoting disproportionate attention and resources to the AI apocalypse has the potential to distract policymakers from addressing AI's more immediate harms and challenges and could discourage investment in research on AI's present social impacts."[42]

Part I lays the groundwork for the theoretical part that follows. I first discuss AI from three different angles: I highlight important historical milestones in the development of AI, briefly explaining the current state of AI research, and offer projections and analysis for the upcoming decades. I then expand on the concept of AI, delving deeper into the origin of the "artificial intelligence" concept in a quest to refine and redefine the term from a legal perspective. Finally, I

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[38] Samuel Gibbs, "Elon Musk: Artificial Intelligence Is Our Biggest Existential Threat" (27 October 2014), online: *The Guardian* <theguardian.com/technology/2014/oct/27/elon-musk-artificial-intelligence-ai-biggest-existential-threat>.

[39] Bostrom defines superintelligence as "*any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest*." Bostrom, *supra* note 8 at 22.

[40] J G Castel & M Castel, *supra* note 8 at 4. The Centre of Existential Risk at Cambridge and The Future of Humanity Institute at Oxford University warns from the risks AI technology might pose. See e.g. *Strategic Artificial Intelligence Research Centre* <fhi.ox.ac.uk/research/research-areas/strategic-centre-for-artificial-intelligence-policy>. See also Edward M Geist, "Is Artificial Intelligence Really an Existential Threat to Humanity?" (9 August 2015), online: *Bulletin of the Atomic Scientists Book Review* <thebulletin.org/artificial-intelligence-really-existential-threat-humanity8577>. These ominous predictions are not shared by everyone. See Eric Sofge, "Why Artificial Intelligence Will Not Obliterate Humanity: It's Not Smart Enough to Turn Sinister" (19 March 2015), online: *Popular Science* <popsci.com/why-artificial-intelligence-will-not-obliterate-humanity>.

[41] The 100 Year Study, *supra* note 22 at 6.

[42] Ryan Calo, "Artificial Intelligence Policy: A Primer and a Road Map" (2017) 51:2 UC Davis L Rev 399 at 431 [Calo – AI Policy].

conclude the discussion and segue into Part II, where I outline the IP theoretical discussion and consider whether AI technology is applicable to one or more of IP theories. In Part II, I also discuss the developments of computer software legal protection and the implications of IP laws for technology in the future. In Part III, I further develop the copyright discussion seeking an answer to the question of "who" is the author of AI creation – the programmer, the user, the AI - or whether AI creations should be left in the public domain. I also examine copyright standards and machine creativity. In Part IV, I discuss my conclusions and provide a road map for AI authorship.

1.2 THE SINGULARITY IS NEAR

1.2.1 The AI Momentum

AI technology is in some respects older than many people realize. The term "artificial intelligence" was coined during the mid-1950s.[43] However, the origins of AI as a field of research go back to Alan Turing's investigations of computer intelligence.[44] Though many continued Turing's research in the ensuing decades, it was not until the mid-late 1990s or early 2000s that AI gained momentum as a field.[45]

In his popular book, *The Singularity Is Near: When Humans Transcend Biology*,[46] Ray Kurzweil[47] reflects on the future of humanity in the upcoming decades of meta-ideas and mass information.[48] Kurzweil defines *singularity* as "a future period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed."[49] "The key idea," explains Kurzweil, "is that the pace of change of our human-created technology is accelerating, and its powers are expanding at an exceptional pace."[50] Given recent developments, Kurzweil argues that information-based technology will engulf all human

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[43] Russell & Norvig, *supra* note 6; McCorduck, *supra* note 3; John McCarthy et al, "A Proposal for the Dartmouth Summer Project on Artificial Intelligence" (Dartmouth University, 1955), online: <www-formal.stanford.edu/jmc/history/dartmouth/dartmouth.html> [The Dartmouth Proposal].

[44] Alan M Turing, "Computing Machinery and Intelligence" (1950) LIX:236 Mind 433. Alan Turing was a British mathematician who played a major role during the Second World War in the decryption of the infamous Nazi "Enigma" machine.

[45] US, Executive Office of the President, *Preparing for the Future of Artificial Intelligence* (2016) at 5-6, online (pdf): <obamawhitehouse.archives.gov/sites/default/files/whitehouse_files/microsites/ostp/NSTC/preparing_for_the_future_of_ai.pdf> (providing a short summary of the history of AI) [Preparing for the Future of AI Report]; US, Executive Office of the President, *The National Artificial Intelligence Research and Development Strategic Plan* (2016) at 12, online (pdf): <nitrd.gov/PUBS/national_ai_rd_strategic_plan.pdf> (outline the current state of AI) [US AI Strategic Plan]; The 100 Year Study, *supra* note 22 at 50-2 (a concise summary of AI history).

[46] Kurzweil, *supra* note 8 at 7; See also Murray Shanahan, *The Technological Singularity* (Cambridge, Mass: MIT Press, 2015).

[47] Ray Kurzweil is a distinguished computer science researcher and considered the "guru" of artificial intelligence. He is the Director of Engineering at Google since 2012. His blog <kurzweilai.net> is a main source for information about AI technology.

[48] Kurzweil, *supra* note 8 at 3.

[49] *Ibid*.

[50] *Ibid* at 7-8.

knowledge and proficiencies in the upcoming decades, "ultimately including the pattern-recognition powers, problem-solving skills, and emotional and moral intelligence of the human brain itself."[51]

We can find support for Kurzweil's predictions in books, articles, and scientific progress.[52] Take, for example, the fact that the computational capacity of the human brain was estimated in 2015 to be in the range of 10^{18} computations per second, whereas computer speeds between 2007 and 2015 grew at a rate of 82 percent per year.[53] However, not everyone shares Kurzweil's optimism. Despite the progress in recent years, most of the AI advancement has been made in an area considered "narrow AI".[54] Little progress, if any, has been attributed in "general AI".[55]

William Nordhaus challenges Kurzweil's assumptions as well.[56] Nordhaus claims that we are not on the verge of accelerated change – or at least not soon, as Kurzweil, Schmidt, and Cohen contend.[57] Nordhaus offers a rebuttal: where are the economic signs of singularity? If we are indeed

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[51] *Ibid* at 8.

[52] J G Castel & M Castel, *supra* note 8 at 1; See also Gordon E Moore, "Moore's Law at 40" in David C Brock, ed, *Understanding Moore's Law: Four Decades of Innovation* (Philadelphia: Chemical Heritage Foundation, 2006); Vincent C Müller & Nick Bostrom, "Future progress in artificial intelligence: A survey of expert opinion" in Vincent C Müller, ed, *Fundamental Issues of Artificial Intelligence* (Springer Berlin, 2016) at 553; Bostrom, *supra* note 8.

[53] William D Nordhaus, "Are We Approaching an Economic Singularity? Information Technology and the Future of Economic Growth" (2015) Cowles Foundation Discussion Paper 2021 at 4. J G Castel & M Castel, *supra* note 8 at footnote 7, indicate that "one of the world's fastest supercomputers is China's Tianhe-2 which has very large hardware, uses megawatts of power and cost US $390 million to build. Its total calculations per second can reach 33.86 Petaflops/s (quadrillion) which is much more than a human brain's capacity to calculate."

[54] US AI Strategic Plan, *supra* note 45 at 14. The report explains the difference between narrow and general AI, *ibid* at 19: "Narrow AI systems perform individual tasks in specialized, well-defined domains, such as speech recognition, image recognition, and translation … the long-term goal of general AI is to create systems that exhibit the flexibility and versatility of human intelligence in a broad range of cognitive domains, including learning, language, perception, reasoning, creativity, and planning. Broad learning capabilities would provide general AI systems the ability to transfer knowledge from one domain to another and to interactively learn from experience and from humans."

[55] US AI Strategic Plan, *supra* note 45 at 14. The recent UK report on AI have reached a similar conclusion. See UK, Select Committee on Artificial Intelligence, *AI in the UK: Ready, Willing and Able?* (16 April 2018) at 15, online (pdf): <publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf> [AI in the UK report].

[56] Nordhaus, *supra* note 53.

[57] Eric Schmidt & Jared Cohen, *The New Digital Age: Reshaping the Future of People, Nations and Business* (London: John Murray, 2013). See also Shanahan, *supra* note 46; Ryan Calo, "The Sorcerer's Apprentice, Or: Why Weak AI Is Interesting Enough" (30 August 2011), online (blog): *The Center for Internet and Society at Stanford Law School Blog* <cyberlaw.stanford.edu/blog/2011/08/sorcerers-apprentice-or-why-weak-ai-interesting-enough>.

on the brink of an accelerated technological era, there should already be signs indicating that the "singularity" is indeed near. Nordhaus' research reveals few indications that support the accelerated singularity argument; in fact, he finds that only two of seven economic tests indicate an imminent singularity.[58] It is his view that "the time at which the economy might plausibly cross the Singularity is 100 years or more" in the future.[59]

A prudent approach might prove to be a good idea. After all, humanity is inclined to reject revolutionary ideas until they materialize. In 1828, it was the famous economist Jean-Baptiste Say who concluded that no machine would ever be able to perform what even the worst horses could.[60] He was wrong. In less than 200 years humanity moved from horses to automated vehicles. From a historical perspective, these advancements were as fast as a lightning strike.

In the past decade, several surveys and studies have sought to answer the very same and intriguing question – when will we reach high-level machine intelligence?[61] Indeed, with no substantive scientific evidence that can point to a conclusive result, expert opinions might be the most reliable source we have to establish whether an AI revolution is indeed upon us, and if so, when.

The first surveys were taken in 2006 and 2007. In 2006, attendees of the AI@50 conference were given a set of questions. 41% agreed that computers would be able to simulate every aspect

[58] Which Nordhaus defines as "a time when the economic growth rate crosses 20% per year." Nordhaus, *supra* note 53 at 28-9.
[59] *Ibid* at 28. The singularity argument is relevant to the question of *when* we can expect a singularity "moment". If we accept Kurzweil's argument, we might as well accept the general idea that in a decade or two AI will become a significant part of our lives. On the other hand, if we accept Nordhaus' argument, we might agree with Arthur Miller's statement that these issues are too futuristic, and we should address them in due course. I shall contend that even if Nordhaus is correct, and the singularity era is in no way near, it is nonetheless important to consider the effects of singularity. For Miller's work see Arthur R Miller, "Copyright Protection for Computer Programs, Databases, and Computer-Generated Works: Is Anything New Since Contu?" (1993) 106 Harv L Rev 977.
[60] Jean B Say, *Cours Complet D'economie Politique Pratique* (Chez Rapilly, 1828).
[61] AGI, or General AI, is the term used in computer science to describe future AI systems that can express human level intelligence. See also *supra* note 54.

of human intelligence in more than 50 years, while the same percentage thought this scenario would never happen.[62] Bruce Klein took a different survey the following year.[63] Klein asked only one specific question: "When would AI *surpass* human intelligence?" Most respondents expressed the notion that AI will surpass human intelligence during the next half of the century.[64]

The next survey was initiated during the second conference on artificial general intelligence held in 2009 (AGI-09).[65] The AGI-09 attendees (21 in total) were given a survey on the theme of "How long till AGI?"[66] According to Baum, Goertzel and Goertzel, "[M]ost experts expect human-level AI to be reached within upcoming decades, and all experts give at least some chance that some milestones will be reached within this time."[67] 75% expect that AI will pass the Turing test by 2050 and 50% believe that AI will reach the stage of superhuman by the year 2045. Most experts assume, with almost certainty, that AI will surpass human capabilities by the end of this century.[68]

Not surprisingly, most respondents believe that massive AI funding "would cause the AI milestones to be reached sooner."[69] The study also revealed a disagreement concerning the order of the developments (which stages come first).[70] In referring to the earlier studies from 2006 and

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[62] Seth D Baum, Ben Goertzel & Ted G Goertzel, "How Long Until Human-Level AI? Results from an Expert Assessment" (2011) 78:1 Tech Forecasting & Soc Change 185 at 186 [Baum, Goertzel & Goertzel]. See also, online: <aiimpacts.org/ai50-survey>.

[63] Klein survey is hard to access, though mentioned in both Müller & Bostrom's, *supra* note 52, and Baum, Goertzel & Goertzel's, *supra* note 62 at 187. There are several limitations to Klien's survey. First, it is an informal study. Klein relays on a broad population – 888 responses – consists of non-experts. Second, the study focuses on one issue – superhuman AI.

[64] 150 (17%) stated that superhuman AI will be reached between 2020 and 2030 while 231 (26%) believed superhuman AI will be reached between 2030 and 2050. 81 (9%) responded that superhuman AI is expected beyond the year 2100. Only 64 (7%) responded that superhuman AI will never happen. Baum, Goertzel & Goertzel, *supra* note 62 at 187.

[65] James Barrat & Ben Goertzel, "How Long Till AGI? — Views of AGI-11 Conference Participants" (16 September 2011), online: *Images* <hplusmagazine.com/2011/09/16/how-long-till-agi-views-of-agi-11-conference-participants>.

[66] Baum, Goertzel & Goertzel, *supra* note 62 at 188. The participants "have a range of levels of expertise, from graduate students to senior researchers."

[67] *Ibid* at 185.

[68] *Ibid* at 189-190.

[69] *Ibid* at 190. It should be noted, however, that for most respondents the difference was small – a few years only.

[70] *Ibid* at 191. For example, one expert stated that an AI might wish to hide its mental superiorities.

2007, Baum, Goertzel and Goertzel conclude that "it is likely that AGI at the human level or beyond will occur around the middle of this century, and plausibly even sooner."[71]

During the same year that Baum, Goertzel and Goertzel published their study, James Barrat conducted an informal survey of his own among 200 attendees of the 2011 Artificial General Intelligence conference (AGI-11). Barrat's informal survey, published later in his book,[72] showed similar results to the AGI-09 survey.[73]

Finally, Vincent Müller and Nick Bostrom's 2016 study collected predictions from 550 AI experts. The survey focused on individuals from four different groups: AI philosophers and theorists, technical experts, members of the Greek Association for AI and top AI authors.[74] Müller and Bostrom were interested in the *probability* of a high-level machine intelligence (HLMI) in the future.[75] Most of the respondents asserted that AI was likely to reach human ability by 2040-50 (over 50%),[76] and 90% believe it is very likely to happen by 2075. 10% responded that after reaching human capacity, it would take two more years for an AI to become superintelligence, while 75% thought that it would take longer – up to 30 years (or less). Only 31% believe that these developments would turn out to be bad or extremely bad for humanity.

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[71] *Ibid* at 194.
[72] James Barrat, *Our Final Invention: Artificial Intelligence and the End of the Human Era* (New York: Thomas Dunne Books, 2013).
[73] *Ibid* at 196.
[74] Müller & Bostrom, *supra* note 52 at 2.
[75] The exact phrasing of the question, *ibid* at 9: "For the purposes of this question, assume that human scientific activity continues without major negative disruption. By what year would you see a (10% / 50% / 90%) probability for such HLMI to?" For each of these three probabilities, the respondents were asked to select a year [2012–5000, in one-year increments] or check a box marked "never".
[76] *Ibid* at 14-5. Kurzweil "set the date for the Singularity – representing a profound and disruptive transformation in human capability – as 2045. The nonbiological intelligence created in that year will be one billion times more powerful than all human intelligence today." See Ray Kurzweil, "Singularity Q&A" (9 December 2011), online (blog): *Ray Kurzweil* <kurzweilai.net/singularity-q-a>.

Given the futuristic nature of these questions, no expert can provide any substantial evidence for such forecasts.[77] The studies I have outlined offer different perspectives to the prospect of AI intelligence. It seems that there is a consensus that we will reach human-level intelligence (or artificial general intelligence) within the next three decades (between 2020 and 2050) and following singularity, superhuman intelligence is expected soon after. Among the many experts, only a small fraction is willing to indicate that we will never achieve human-level intelligence.[78] Thus, there is overwhelming support among leading experts for the *probability* that AI will reach singularity in the coming decades. However, it might not matter when exactly singularity happens. Whenever it might be reached, there is no reason not to be planning for its legal consequences.

A review of the recent history of computer science developments can provide guidance, allowing us to understand better what lies ahead.

1.2.2 A Look Back – A Brief History of AI

AI development began with dreams. Throughout history, humans have always been fascinated by the concept of non-human creations. Pamela McCorduck has traced several routes to AI: *imagination* ("what might be"); *philosophical inquiry* ("the bridge between imagination and what is"); *what is* or *present realities* ("artificial intelligence as it has been realized since the development of the digital computer").[79]

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[77] Few have expressed their concern about the validity of the survey and the conclusions. Oren Etzioni shared his skepticism stating that "predictions that superintelligence is on the foreseeable horizon are not supported by the available data. Moreover, doom-and-gloom predictions often fail to consider the potential benefits of AI in preventing medical errors, reducing car accidents, and more. Finally, it's possible that AI systems could collaborate with people to create a symbiotic superintelligence. That would be very different from the pernicious and autonomous kind envisioned by Professor Bostrom." Oren Etzioni, "No, the Experts Don't Think Superintelligent AI is a Threat to Humanity" (20 September 2016), online (blog): *MIT Technology Review* <technologyreview.com/s/602410/no-the-experts-dont-think-superintelligent-ai-is-a-threat-to-humanity>.

[78] Müller & Bostrom, *supra* note 52 at 11.

[79] McCorduck, *supra* note 3 at 4.

In the “imagination era”, AI was treated much like the product of the Gods of old. Gods created non-human beings to protect or to threaten humans, and stories in Greek and Egyptian mythology stand as a testament to human imagination.[80] However, imagination was only the beginning: “From the sixteenth century on, a population explosion of automata took place,” and soon what people perceived as the power of Gods (or magic) came to life.[81] McCorduck explains that “[t]he art of mechanical statues flourished in the seventeenth and eighteenth centuries”[82] and, by the nineteenth century, the AI “that penetrated and dwelled in people’s imaginations [was] composed of the printed word rather than wood and metal and cloth.”[83]

Calculating machines were the next evolutionary step. Blaise Pascal built the first calculating machine in 1642,[84] and, in 1822, Charles Babbage “constructed a small working model of his automatic table calculator.”[85] Practical problems drove Babbage and his predecessors and successors. However, “artificial intelligence … did not originate in the search for solutions to practical problems, though even its severest critics agree that it has made many useful contributions.”[86]

Contrary to common belief, the German engineer Konrad Zuse (and not British or American engineers) created the first general-purpose program-controlled digital computer.[87] Russell and Norvig argue that the first AI work was done by Warren McCulloch and Walter Pitts

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[80] *Ibid* at 4-13.
[81] *Ibid* at 13.
[82] *Ibid* at 14.
[83] *Ibid* at 15. E T A Hoffman, *The Sandman* (1815); *Olympia*; Mary Shelley, *Frankenstein* (1818); Isaac Asimov, *The Rules of Robotics* (1950).
[84] McCorduck, *ibid* at 22.
[85] *Ibid* at 23. The British Government was so impressed with Babbage’s invention that they were willing to finance a larger project.
[86] *Ibid* at 29.
[87] *Ibid* at 50. Zuse developed a programming language called the *Plankalkul*, which he thought might be of use for mathematical problems, as well as other applications such as chess moves. Most of Zuse’s work was destroyed during the World War II.

in 1943. McCulloch and Pitts "proposed a model of artificial neurons in which each neuron is characterized as being 'on' or 'off,' with a switch to 'on' occurring in response to stimulation by a sufficient number of neighboring neurons."[88]

In 1946, Alan Turing mentioned "the idea of a computer showing 'intelligence,' with chess-playing as a paradigm."[89] Turing is best known for his "imitation game", the name Turing gave to his AI test (known simply as the Turing test). In 1950, Turing published the paper "Computing Machinery and Intelligence",[90] in which he argued for the possibility of creating a human level of intelligence in computer programs. In 1952, Turing played a game "in which he simulated the computer, taking about half an hour per move" as he possessed no computer with the requisite capabilities.[91] Turing aspired to "test whether the artifact was indistinguishable from a person with regard to what he took to be pertinent property, *verbal behavior*."[92]

Turing proposed to answer the question, "Can machines think?" However, Turing rejected the idea of defining the terms "machine" and "think" with "the normal use of the words". Turing claimed that this attitude is "dangerous", and might make it "difficult to escape the conclusion that the meaning and the answer to the question, 'Can machines think?' is to be sought in a statistical

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[88] Russell & Norvig, *supra* note 6 at 16. The first neural network computer (called the Snarc) was built by Marvin Minsky and Dean Edmonds in 1950.
[89] Nilsson, *supra* note 1 at 123. McCorduck, *supra* note 3 at 50, stated: "The connection between computing machines and thinking was explicit in all the major computer efforts. Nowhere was it more so than in the work of the remarkable British mathematician and logician named Alan Turing (1912-1954). I find Turing to be one of the most appealing figures in this history, though people who knew him are divided."
[90] Turing, *supra* note 44. For further discussions about Turing research see Robert Epstein, Gary Roberts & Grace Beber, eds, *Parsing the Turing Test: Philosophical and Methodological Issues in the Quest for the Thinking Computer* (New York: Springer, 2008).
[91] Nilsson, *supra* note 1 at 123; The game is available online: <chessgames.com/perl/chessgame?gid=1356927>. However, "it was only after a long line of improvements in the sixties and seventies—contributed by groups at Carnegie Mellon, Stanford, MIT, The Institute for Theoretical and Experimental Physics at Moscow, and Northwestern University—that chess-playing programs started gaining proficiency." The 100 Year Study, *supra* note 22 at 13.
[92] Stuart Shieber, ed, *The Turing Test: Verbal Behavior as the Hallmark of Intelligence* (Cambridge, Mass: MIT Press, 2004) Introduction.

survey such as a Gallup poll." Instead, Turing offered to "replace the question by another, which is closely related to it and is expressed in relatively unambiguous words."[93]

Unlike a metric measurement or other technical tests, "the identification of the pertinent properties for intelligence are subtle, and ramified widely in the foundation of the philosophy of the mind."[94] Turing's test was designed to establish which element in the "game" is human and which is machine through verbal interrogation; if the interrogator cannot ascertain which of the players is human, the machine has passed the imitation game, since the machine is able to imitate human behaviour. However, even if a machine does "pass" the imitation test and "tricks" the human interrogator, does it mean that this machine is indeed capable of thoughts and possesses intelligence?[95]

The first stage of AI development following the Turing era, was nicknamed the "*Toy Problem"* stage. As Nils Nilsson explains, "Solving puzzles, playing games such as chess and checkers,[96] proving theorems, answering simple questions, and classifying visual images were among some of the problems tackled by the early pioneers during the 1950s and early 1960s."[97] During that decade, three important meetings coincided with the emergence of AI as a full-fledged field of research: the 1955 Session on Learning Machines that was held in conjunction with the 1955 Western Joint Computer Conference in Los Angeles; the 1956 Summer Research Project on AI held at Dartmouth College in Hanover, New Hampshire; and the 1958 symposium on the

[93] Turing, *supra* note 44 at 433.
[94] Shieber, *supra* note 92.
[95] *Ibid*. See also Michael Scriven, "The Mechanical Concept of Mind" (1953) 62:246 Mind 230.
[96] Nilsson, *supra* note 1 at 253 concludes: "These years, the late 1960s through the mid-1970s, saw computer chess programs gradually improving from beginner-level play to middle-level play. Work on computer chess during the next two decades would ultimately achieve expert-level play […]."
[97] Nilsson, *supra* note 1 at 71.

Mechanization of Thought Processes held at the National Physical Laboratory, Teddington, Middlesex, England.[98]

The Dartmouth workshop is considered the first conference to coin the term AI.[99] The workshop was spearheaded by the founding fathers of AI: John McCarthy (mathematician), Nathaniel Rochester (computer scientist), Claude Shannon (mathematician) and Marvin Minsky (cognitive scientist).[100] The scope of the workshop was described in the proposal written by McCarthy for the Rockefeller Foundation in August 1955:[101]

> *"The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves ...*
>
> *... For the present purpose the artificial intelligence problem is taken to be that of making a machine behave in ways that would be called intelligent if a human were so behaving."*

The Mechanization of Thought Processes symposium was the third important event in the field of AI. Held in the UK in 1958, only a few years after the conclusion of the Dartmouth workshop, the symposium's goal was "to bring together scientists studying artificial thinking, character and pattern recognition, learning, mechanical language translation, biology, automatic programming,

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[98] *Ibid* at 73.

[99] McCorduck, *supra* note 3 at 96, opines: "A dispute occurred over what the new field should be named. Although the conference was officially called The Dartmouth Summer Research Project on Artificial Intelligence, many attendees balked at that term, invented by [John] McCarthy." McCorduck further quoted McCarthy recollections from the conference stating "I [McCarthy] won't *swear* that I hadn't seen it before … but artificial intelligence wasn't a prominent phrase particularly. Someone may have used it in a paper or a conversation or something like that, but there were many other words that were current at the time. The Dartmouth workshop made that phrase dominate the others."

[100] Nilsson, *supra* note 1 at 80. Nilsson concludes that "the 1956 workshop is considered to be the official beginning of serious work in artificial intelligence, and Minsky, McCarthy, Newell, and Simon came to be regarded as the 'fathers' of AI."

[101] *Ibid* at 77; The Dartmouth Proposal, *supra* note 43.

industrial planning and clerical mechanization."[102] Several of the papers that were presented during this symposium influenced the history of AI significantly.

From the early stages of AI development, researchers felt confident enough to share their prediction about the foreseeability of AI success. Herbert Simon, for example, stated that "within 10 years a computer would be chess champion, and a significant mathematical theorem would be proved by machine."[103] These predictions would come true four decades later.

During the 1950s and 1960s, scientists were focused on the Logic Theorist (LT) software[104] as well as pattern recognition[105] of two-dimensional segments such as photographs or pages. Russell and Norvig outline three difficulties AI faced during that decade. First, "early programs knew nothing of their subject matter; they succeeded by means of simple syntactic manipulations."[106] The attempts to translate Russian scientific papers after Sputnik's launch in 1957 serve as a vivid example of this difficulty. As every Google-translate user knows today, it is highly complex to translate words in their original context, and an accurate translation requires a background in both languages to resolve ambiguities. For this reason, the early attempts to use programs in these efforts failed miserably. Subsequently, the US government dropped the idea and all the funding for academic translation was cancelled. The second difficulty "was the intractability of many of the problems that AI was attempting to solve."[107] Third, there were "some fundamental limitations on the basic structures being used to generate intelligent behavior."[108]

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[102] Nilsson, *supra* note 1 at 81, quoting the preface for the symposium.
[103] Russell & Norvig, *supra* note 6 at 21.
[104] LT was invented by three scientists – Allen Newell, Herbert Simon and Cliff Shaw – associated with RAND corporation in Santa Monica and Carnegie Tech in Pittsburgh. See McCorduck, *supra* note 3 at 104-108. LT is considered one of the first AI programs.
[105] The process of analyzing images, signals, or voices and classifying it into categories. See Nilsson, *supra* note 1 at 89.
[106] Russell & Norvig, *supra* note 88 at 21.
[107] *Ibid*.
[108] *Ibid* at 22.

During the 1960s and into the 1970s, AI research progressed modestly.[109] Developments in the 1960s were influenced by several factors, including new computer languages, computer vision,[110] mobile robots,[111] problem-solving of mechanizing intelligent behaviour,[112] government agencies support,[113] and the founding of the Automatic Language Processing[114] Advisory Committee (ALPAC).[115] Books[116] and conferences also promoted developments in the field of AI during this decade.[117]

The 1970s saw a shift from "toy problems" and controlled laboratory environments toward applied work dealing with "real world" issues.[118] Nilsson points to two possible reasons for this

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[109] Nilsson, *supra* note 1 at 167, explains: "Achievements during the preceding years, even though modest in retrospect, were exciting and full of promise … AI entered a period of flowering that led to many new and important inventions."

[110] *Ibid* at 169. In the early 1960s, Woodrow W Bledose, Charles Bisson, and Helen Chan, with the support of the CIA, developed facial recognition techniques. However, "[f]ace recognition programs of the 1960s and 1970s had several limitations. They usually required that images be of faces of standard scale, pose, expression, and illumination." *Ibid* at 173.

[111] *Ibid* at 213. During that time, several groups began to work on mobile robots.

[112] *Ibid* at 157-160.

[113] Such as the office Naval Research (ONR) and the Advanced Research Projects Agency (ARPA).

[114] Nilsson, *supra* note 1 at 141, explains the concept of Natural Language Processing: "Beyond pattern recognition of individual alphanumeric characters, whether they be of fixed font or handwritten, lies the problem of understanding strings of characters that form words, sentences, or larger assemblages of text in a "natural" language, such as English."

[115] *Ibid* at 150, refers to John R Pierce et al, *Language and Machines: Computers in Translation and Linguistics* (Washington, DC: The National Academies Press, 1966) ALPAC Report. In 1968 ALPAC changed its name to the Association for Computational Linguistics (ACL). W John Hutchins stated that the pessimistic report of ALPAC at the beginning of the decade resulted in an end to research in this area: "The influence of the ALPAC report was profound. It brought a virtual end to MT research in the USA for over a decade and MT was for many years perceived as a complete failure ... The focus of MT activity switched from the United States to Canada and to Europe." Hutchins therefore calls the period between 1967 and 1976 "the quiet decade." Nilsson, *supra* note 1 at 237. See also W John Hutchins, "Machine Translation: A Brief History" in E F K Koerner & R E Asher, eds, *Concise History of the Language Sciences: From the Sumerians to the Cognitivists* (New York: Pergamon Press, 1995) at 431-445.

[116] Such as Edward A Feigenbaum & Julian Feldman, *Computers and Thought* (New York: McGraw-Hill, 1963); Nils J Nilsson, *Learning Machines: Foundations of Trainable Pattern-Classifying Systems* (McGraw-Hill, 1965); Frank Rosenblatt, John T Farrow & Sam Rhine, "The Transfer of Learned Behavior from Trained to Untrained Rats by Means of Brain Extracts. I" (1966) 55 PNAS 548; Marvin Minsky & Seymour Papert, *Perceptrons: An Introduction to Computational Geometry* (Cambridge: MIT Press, 1969); Nils J Nilsson, *Problem-Solving Methods in Artificial Intelligence* (New York: McGraw-Hill, 1971); James R Slagle, *Artificial Intelligence: The Heuristic Programming Approach* (New York: McGraw-Hill Book, 1971); Bertram Raphael, *The Thinking Computer: Mind Inside Matter* (San Francisco: W H Freeman, 1976).

[117] Nilsson, *supra* note 1 at 155 and 261. In 1969, Donald E Walker and Alistair Holden organized the International Joint Conference on AI (IJCAI) in Washington DC. It was the first large AI-devoted conference. Subsequent conferences were held in London (1971), North America, and other regions of the world.

[118] *Ibid* at 265.

shift: the increase in power of AI methods and US government investment in research relevant to military needs.[119] The 1970s witnessed an increase in speech recognition research as well,[120] and a study group was formed "to make recommendations concerning the launching of a major Defense Advanced Research Projects Agency (DARPA) – supported project in speech understanding."[121]

By the mid-1970s, the pressure for militarily useful systems intensified, and DARPA focused on shifting resources based on the agenda of the US Department of Defense (DoD).[122] Computer vision "grew into a highly developed subspecialty of AI, joining other specialized areas such as natural language processing, robotics, knowledge representation, and reasoning."[123] In 1976, DARPA launched its Image Understanding Program. The goals of the program were outlined in a 1977 workshop: "The Image Understanding Program is planned to be a five year research effort to develop the technology required for automatic and semiautomatic interpretation and analysis of military photographs and related images."[124] By 1979, the Image Understanding Program's goals extended to mapping and cartography.[125] Though it was supposed to end in 1981, it ended up lasting until 2001.[126]

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[119] *Ibid.* See also Joseph Weizenbaum, *Computers, Power, and Human Reason: from Calculation to Judgment* (San Francisco: W H Freeman, 1976) at 271-2, arguing that AI technology originated in the academia and military.
[120] Nilsson, *supra* note 1 at 267. Speech recognition is "the process of converting an acoustic stream of speech input, as gathered by a microphone and associated electronic equipment, into a text representation of its component words." The process is complicated because many words sound similar. Attempts to develop speech recognition began at Bell Laboratories in the 1930s. The work continued during the 1950s and the 1960s. *Ibid* at 269.
[121] *Ibid* at 270. The study group held several meetings and delivered its final report to DARPA. In 1971, Larry Roberts established at DARPA a five-year speech-understanding project based largely on the study group's work.
[122] *Ibid* at 310. Nilsson describes the suggestions of George Heilmeier (DARPA's then-director): "[G]et computers to read Morse code in the presence of other code and noise; get computers to identify/detect key words in a stream of speech; solve DoD's 'software problem,'; make a real contribution to command and control, and; do a good thing in sonar." *Ibid* at 312.
[123] *Ibid* at 327.
[124] *Ibid* at 338.
[125] *Ibid* at 339.
[126] *Ibid* at 340: "As Ohlander [Navy Commander Ron Ohlander was supervising the DARPA project] said, the IU program was extended beyond its projected five-year lifetime. It is said that even as early as 1984, DARPA had spent

The early 1980s saw progress in expert systems and AI technologies such as image and speech understanding, as well as natural language processing. This accompanied dramatic progress in communications technology, computer networks, and processing technology.[127] The American Association for Artificial Intelligence (AAAI)[128] was founded in this decade, as was Japan's Fifth Generation Computer System AI initiative.[129] The goal of the Japanese initiative "was to produce computers that could perform AI-style inferences from large data and knowledge bases and communicate with humans using natural language."[130] The Fifth Generation, besides having sophisticated software, was built to involve many parallel processors using ultra-large-scale integration.[131]

Growing Japanese dominance in consumer electronics and manufacturing made the American computer industry worry that its world leadership in technology might be weakening. The nonprofit Microelectronics and Computer Technology Corporation (MCC) was therefore formed in 1983. The MCC focused on four areas: advanced computer architectures, software technology, microelectronics packaging, and computer-aided design of very large-scale integration circuitry.[132] Concern about the Japanese initiative contributed to DARPA's new

over $4 million on this effort. One potential application was computer vision for robot-controlled military vehicles – a component of DARPA's 'Strategic Computing' program."

[127] *Ibid* at 359.

[128] *Ibid* at 343. Founded in 1980. Known today as the Association for the Advancement of Artificial Intelligence. During the 1980s, membership in the AAAI reached a peak of more than 16,000 people. *Ibid* at 344.

[129] The phrase "Fifth Generation" derived from earlier generations of computer technology such as World War II First Generation vacuum tubes, 1959 Second Generation transistors (that were connected with copper wires), 1960s Third Generation small-scale integration, and the 1970s Fourth Generation very large-scale integration.

[130] Nilsson, *supra* note 1 at 349.

[131] *Ibid*. In small-scale integration, "transistors and other components were fabricated on single silicon wafer 'chips,' and the several chips comprising a computer were connected together by wires." In very large-scale integration, "entire microprocessors could be put on a single chip."

[132] *Ibid* at 354.

"Strategic Computing Program",[133] in which AI played a major role.[134] The British reacted to the Japanese project by forming a committee,[135] while the European Economic Community established the European Strategic Program of Research in Information Technology (ESPRIT).[136]

Throughout the 1980s, AI enjoyed increased popularity and commercial success. "New results unfolded in all of its subfields, including reasoning and representation, machine learning,[137] natural language processing, and computer vision."[138] In the beginning of the 1980s many, including government and industry leaders, shared great expectations of the potential for AI. As Russell and Norvig offer, "Overall, the AI industry boomed from a few million dollars in 1980 to billions of dollars in 1988, including hundreds of companies building expert systems, vision systems, robots, and software and hardware specialized for these purposes."[139]

However, this honeymoon period did not last, and the end of the decade was nicknamed the "AI Winter".[140] During the AI Winter, funding to AI was cut, and many companies went out of business. The common explanation for the change toward AI research is the high expectations

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[133] According to Nilsson, *ibid* at 362, the program had three major applications in mind to gain military support: "Pilot's Associate (for the Air Force), an aircraft carrier 'Battle Management System' (for the Navy), and an 'Autonomous Land Vehicle' (for the Army)." We might as well say that the idea for self-driving cars was planted back then.

[134] *Ibid* at 359-361. As Nilsson explains, "During the decade from 1983 to 1993 DARPA spent just over $1 billion on SC.9 The plan envisioned supporting two main thrusts, namely, major projects that would build specific applications and basic research to develop the "technology base" that would be needed for those applications." *Ibid* at 361.

[135] *Ibid* at 355.

[136] *Ibid* at 356. ESPRIT was EU's response to the Japanese initiative and its goal was to foster transnational collaboration within the EU and among research industries, organizations, and academic institutes.

[137] The term Machine-Learning (or ML) is often conflated or misused with the term artificial intelligence. However, while AI might include ML, ML is only a particular type of AI. ML describing an algorithm's ability to improve with experience without being programmed when provided with enough data. See also David Lehr & Paul Ohm, "Playing with the Data: What Legal Scholars Should Learn about Machine Learning" (2017) 51:2 UC Davis L Rev 653 at 655. Lehr and Ohm explain ML as "the name for a large family of techniques used for sophisticated new forms of data analysis that are becoming key tools of prediction and decision-making." They divide the process of ML into eight steps: "problem definition, data collection, data cleaning, summary statistics review, data partitioning, model selection, model training, and model deployment."

[138] Nilsson, *supra* note 1 at 433.

[139] Russell & Norvig, *supra* note 88 at 24.

[140] Nilsson, *supra* note 1 at 345; See also The 100 Year Study, *supra* note 22 at 51.

driven by the over-optimism of AI scientists. When the realization grew that an AI singularity was not on the horizon, confidence in AI's ability sank, and, with it, funding.[141]

The late 1980s also marked the growing interest of the legal community in AI. One significant event occurred in May 1987 with the first international conference on AI & law (known since as ICAIL) in Boston, US.[142] The ICAIL is considered the "birth of an AI and Law *community*."[143] Few other indications for the emergence of an AI & Law community followed the establishment of what would soon become ICAIL traditions. First came the EU Jurix conferences that have been held since 1988 annually. Second came the founding, in 1992, of the AI & Law Journal. Third came the holding of the international association for AI and Law inaugural meeting in 1991 during the third ICAIL.[144]

1.2.3 Current Trends in AI – Assessing the AI Potential and Risks

1.2.3.1 The (Re)emergence of AI Technology

The 1990s and 2000s marked a new era for AI as developments in computer science (especially in neural-networks in the mid-2000s) increased its potential.[145] Since then there were several significant achievements, mainly after the 1997 victory of IBM's Deep Blue computer over the chess champion Garry Kasparov.[146] In 2011, IBM's Watson won the trivia game show *Jeopardy!*,

[141] Nilsson, *ibid* at 409, indicates that during the AI winter membership in the AAAI fell, DARPA budget to AI was cut from 47 million dollars to 31 million dollars, and "[a]dvertising in the AI Magazine dropped … as did participation by government and industry in AI conference exhibits. Several AI companies closed their doors, and AI research at some of the larger computer hardware and software companies was terminated."
[142] Trevor Bench-Capon et al, "A history of AI and Law in 50 Papers: 25 Years of the International Conference on AI and Law" (2012) 20 AI & L 216 [AI & Law in 50 papers].
[143] AI & Law in 50 papers, *ibid* at 217. Many central ideas in the AI field were introduced during ICAIL and developed in the following conferences.
[144] *Ibid*.
[145] The neural-networks developments could be attributed to Geoffrey Hinton's research: "The team showed that these networks, which could automatically process unlabelled data, could be more effective at a wide range of tasks, such as image and speech recognition, than the more conventional algorithms then in use." AI in the UK report, *supra* note 55 at 18.
[146] Preparing for the Future of AI Report, *supra* note 45.

and in the same year DARPA developed CALO (Cognitive Agent that Learns and Organizes), which would lead to Apple's Siri.[147] In early 2016, an AI computer (AlphaGo) defeated a human master in the game of *Go*,[148] and in January 2017, Libratus, an AI computer program, beat the best poker players in the world in matches worth more than $1.7 million USD in chips.[149]

Machines are outsmarting humans not only in games but also in the labour market. Algorithms are increasingly being used in fields like insurance, finance, human resources and medicine.[150] Benjamin Alarie, Anthony Niblett and Albert Yoon offer that "[m]achines today not only perform mechanical or manual tasks once performed by humans, but they are also performing thinking tasks, where it was long believed that human judgment was indispensable. From self-driving cars to self-flying planes, and from robots performing surgery on a pig to artificially intelligent personal assistants, so much of what was once unimaginable is now reality."[151]

These advancements in AI have become possible as a result of developments in AI research. Russell and Norvig suggest that one of the most important effects on AI research was the Internet: AI systems become very common in web-based applications, and AI technologies underlie many Internet tools such as search engines.[152] During that time, researchers were drawn back to early aspirations to create a general intelligent agent – AI that can perform a wide range of

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[147] *Ibid.*
[148] Go is an abstract strategy game invented in China 5,500 years ago. See Wikipedia, "Go (game)" (last edited 2 October 2018), online: <en.wikipedia.org/wiki/Go_(game)>. Dana Mackenzie, "Update: Why this week's man-versus-machine Go match doesn't matter (and what does)" (15 March 2016), online: *Science* <sciencemag.org/news/2016/03/update-why-week-s-man-versus-machine-go-match-doesn-t-matter-and-what-does>; Benjamin Alarie, Anthony Niblett & Albert H Yoon, "Focus Feature: Artificial Intelligence, Big Data, and the Future of Law" (2016) 66 UTLJ 423.
[149] Olivia Solon, "Oh the humanity! Poker computer trounces humans in big step for AI" (31 January 2017), online: *The Guardian* <theguardian.com/technology/2017/jan/30/libratus-poker-artificial-intelligence-professional-human-players-competition>.
[150] Alarie, Niblett & Yoon, *supra* note 148.
[151] *Ibid* at 424.
[152] Russell & Norvig, *supra* note 88 at 26-27.

tasks and can learn and use knowledge in a similar way to humans.[153] Further, AI has become dominant in other fields, creating a mixture of approaches which in turn speeds up progress in areas such as robotic cars.[154]

The US AI Strategic Plan describes three waves of technological advancement in recent decades. The first focused on handcrafted knowledge, with a strong rule-based expert system "in which knowledge was collected from a human expert, expressed in 'if-then' rules, and then implemented in hardware." The second wave began with the new millennium and characterized by the advancement of machine learning.[155] The current wave of progress began around 2010 and is driven by three factors.[156] First is the availability of big data from sources including social media, business, e-commerce, science, and government.[157] Second, these data provide the raw material for improving machine-learning approaches and algorithms.[158] Third, the latter in turn rely on the capabilities of more powerful computers.[159]

In a hearing before the US Senate Committee on Commerce Subcommittee on Space, Science and Competitiveness in 2016,[160] Eric Horvitz concurred with the assessment that a key

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[153] *Ibid* at 27. The most known example is John Laird, Allen Newell, and Paul Rosenbloom SOAR project. Laird explains the whole agent capabilities and concept: "These capabilities include interacting with dynamic complex environments, pursuing a wide variety of tasks, using large bodies of knowledge, planning, and continually learning from experience … our approach to developing human-level agents is to study the *cognitive architecture* underlying general intelligence … A cognitive architecture provides the fixed computational structures that form the building blocks for creating generally intelligent systems." John E Laird, *The Soar Cognitive Architecture* (Cambridge, Mass: MIT Press, 2012) at 1.

[154] Russell & Norvig, *supra* note 88 at 27.

[155] US AI Strategic Plan, *supra* note 45 at 12.

[156] It seems that we are moving toward a next phase of AI progress – explanatory and general AI technologies. See US AI Strategic Plan, *supra* note 45 at 14.

[157] As Russell & Norvig, *supra* note 88 at 27, provide: "Throughout the 60-year history of computer science, the emphasis has been on the algorithm as the main subject of study. But some recent work in AI suggests that for many problems, it makes more sense to worry about the data and be less picky about what algorithm to apply."

[158] Russell & Norvig, *ibid* at 28, further explain: "[I]n AI—the problem of how to express all the knowledge that a system needs—may be solved in many applications by learning methods rather than hand-coded knowledge engineering, provided the learning algorithms have enough data to go on."

[159] Preparing for the Future of AI Report, *supra* note 45 at 6, relying on the 100 Year Study, *supra* note 22 at 8-9.

[160] Eric Horvitz statement to the US Senate Committee on Commerce Subcommittee on Space, Science and Competitiveness, *Reflections on the Status and Future of Artificial Intelligence* (30 November 2016) at 3, online (pdf):

factor in the rate of AI development is "the availability of unprecedented streams of data, coupled with drops in the cost of storing and retrieving that data."[161] Other important factors "include dramatic increases in available computing power, and jumps in the prowess of methods for performing machine learning and reasoning. The past thirty years of AI research also saw the rise and maturation of methods for representing and reasoning under uncertainty."[162]

As the US AI Strategic Plan has indicated: "[F]rom 2013 to 2015 the number of Web of Science-indexed journal articles mentioning 'deep learning' increased six-fold ... The trends also reveal the increasingly global nature of research, with the United States no longer leading the world in publication numbers, or even publications receiving at least one citation."[163] Further, the US AI Strategic Plan stated a sharp increase "in the number of patents that use the term 'deep learning' or 'deep neural net' … a four-fold increase in venture capital directed to AI startups" (between 2013 and 2014) and other significant implications on financial systems and large businesses.[164]

It seems that humanity has already passed through the three routes described by McCorduck.[165] We are now climbing the steps toward the next route: singularity. This route is much different from the others since in many ways humans might not be able to control their pace

<erichorvitz.com/Senate_Testimony_Eric_Horvitz.pdf> [Horvitz Report]. See also Eric Horvitz, "One Hundred Year Study on Artificial Intelligence: Reflections and Framing" (2014), online: <ai100.stanford.edu/reflections-and-framing>. Eric Horvitz is a distinguished computer scientist and the managing director of Microsoft's main lab. See his website <erichorvitz.com>.

161 Horvitz Report, *supra* note 160 at 3.

162 *Ibid*.

163 US AI Strategic Plan, *supra* note 45 at 12. Lawyers also began expressing their own interest in AI. In 2012, marking 25 years of legal research in the field of AI, the AI & Law Journal selected 50 papers from the thirteen ICAIL conferences providing an interesting overview of the legal development in the AI field. The 'AI & Law in 50 papers' "consists of a discussion of 50 papers that first appeared at ICAIL, but in so doing it provides something of a history of the field, and an opportunity to reflect on progress made and lessons learned." AI & Law in 50 papers, *supra* note 142 at 217.

164 US AI Strategic Plan, *supra* note 45 at 12.

165 McCorduck, *supra* note 3.

– or turn back. None can tell what we might find when we push forward in this direction. Humanity's dreams (or nightmares) may come true.

1.2.3.2 Regulating AI[166]

Recent developments have stirred both interest in and concern about the AI revolution. Several authors have discussed the urgency with which we must think about prudent AI policy and have offered suggestions for regulatory changes that can minimize risks without hindering innovation. Under former US president, Barack Obama, the US has made significant progress in developing AI policy.

The Obama administration formed the National Science and Technology Council (NSTC) subcommittee on machine learning and AI. Soon after, NSTC instructed the Networking and Information Technology Research and Development (NITRD) subcommittee to establish a National AI Research and Development (R&D) Strategic Plan, founding a "task force" on AI to shape the US Federal Strategic Plan for AI R&D.

The US AI Strategic Plan supports priorities areas that are unlikely to be addressed by the industry itself[167] "and thus areas that are most likely to benefit from Federal investment."[168] The US AI Strategic Plan's report concluded with two recommendations: First, "[d]evelop an AI R&D implementation framework to identify S&T [science and technology] opportunities and support effective coordination of AI R&D investments"; second, "[s]tudy the national landscape for

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[166] For a broader discussion see Gaon & Stedman, *supra* note 31.

[167] US AI Strategic Plan, *supra* note 45 at 3. The US AI Strategic Plan established objectives for federal government-funded projects both within and outside the government. The goal of the research is "to produce new AI knowledge and technologies that provide a range of positive benefits to society, while minimizing the negative impacts." The report identifies seven strategic priorities for federally-funded AI research: make long-term investments in AI research; develop effective methods for human-AI collaboration; understand and address the ethical, legal, and societal implications of AI; ensure the safety and security of AI systems; develop shared public datasets and environments for AI training and testing; measure and evaluate AI technologies through standards and benchmarks; and better understand the national AI R&D workforce needs.

[168] *Ibid* at 15.

creating and sustaining a healthy AI R&D workforce."[169] The Obama administration published two additional reports on future considerations on AI: "Preparing for the Future of AI" and "AI and the Economy". Both reports survey expected changes (market, labour force, *etc*.), AI and automation potential to the US economy and make recommendations.[170]

In Canada, the 2017 and the 2018 budgets emphasized Canada's strategic plan in the "digital future", committing $125 million in its 2017 budget to launch a "Pan-Canadian Artificial Intelligence Strategy for research and talent," and $1.7 billion over five years for research in the 2018 budget.[171] The 2017 budget set the stage for building an AI policy in Canada by shifting resources toward AI R&D.[172] The task of managing the AI funds was assigned to the Canadian Institute for Advanced Research (CIFAR), which will implement the AI Strategy in order to promote collaboration between Canada's main centres of expertise.

Following the 2017 budget, the Federal Government has recognized the strategic importance of AI to Canada and has invested heavily in AI including earmarked $950 million to fund the AI superclusters and executing AI strategy.[173] Among Canada's provinces, Ontario's AI initiatives focus mainly on education.[174] According to a recent report, Canadian efforts are starting

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[169] *Ibid* at 4.

[170] Preparing for the Future of AI Report, *supra* note 45; AI & the Economy White Paper, *supra* note 4.

[171] Ministry of Finance, *Budget 2017: Building a Strong Middle Class* (22 March 2017) at 104, online (pdf): <budget.gc.ca/2017/docs/plan/budget-2017-en.pdf>. The 2018 budget reinforces Canada's commitment to AI research, see Ministry of Finance, *Equality + Growth: A Strong Middle Class* (27 February 2018) at 85 and 93, online (pdf): <budget.gc.ca/2018/docs/plan/budget-2018-en.pdf>.

[172] *Budget* 2017, *ibid* at 104: "Budget 2017 proposes to provide $125 million to launch a Pan-Canadian Artificial Intelligence Strategy for research and talent."

[173] *Ibid* at 103-4; Ontario's AI Opportunity Report, *supra* note 28 at 18. A "cluster" is a group of companies that work together on a specific project. A supercluster builds on that idea into a larger scope of the group. The supercluster initiative "convene industry players, with collaborative organizations, funding, and research institutions to enable projects that individual companies would be incapable of tackling alone due to a lack of funds, ideas, or specific skill sets." Ontario's AI Opportunity Report, *ibid* at 19.

[174] Vector Institute is the leading AI research center in Ontario (and in Canada), funded by CIFAR and affiliated with several universities in Ontario. Ontario's AI education initiatives also include investment in STEM (Science, Technology, Engineering and Math) and AI related education (like the government aim to have 1,000 annual Master level graduates in applied AI-related fields). Ontario's AI Opportunity Report, *supra* note 28 at 20-21. In that regard, Ontario's vision correlates with the UK and the US vision – making AI education a priority.

to pay off and "[t]he country is being recognized on the world stage for creating products and services that are leading the field."[175]

Matthew Castel and Jean Gabriel Castel have outlined several policy considerations that provincial and the federal governments should address regarding AI risks and concerns.[176] They suggest imposing a legal status on self-driving cars and other AIs and robots,[177] and recommend introducing a registration system for advanced robots.[178] The Castels go as far as to support entitling AI to the full protections of the *Canadian Charter of Rights and Freedoms*, a bold, and somewhat premature, proposal.[179] I share the Castels' view that the most pressing issue in the field of AI is self-driving cars and their concern that the current laws in Canada are not suitable for introducing this technology as well as other urgent challenges posed by developments in AI.[180]

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[175] Ontario's AI Opportunity Report, *supra* note 28 at 21. The report provides several examples: 16-bit (Toronto, medical diagnosis), Layer 6 (finance), Acerta Analytics Solutions (Kitchener, manufacturing industry), Finn.ai (Vancouver, finance).

[176] See Matthew E Castel & Jean-Gabriel Castel, "The Impact of Artificial Intelligence on Canadian Law and Legal Profession" (2016) 46 Adv Q 34 [The Impact of AI on Canadian Law]; J G Castel & M Castel, *supra* note 8.

[177] The Impact of AI on Canadian Law, *ibid* at 36: "Since the Canadian Constitution does not prevent the provinces and territories, or the courts by inventive interpretation, from regulating robots as legal persons or as private or public corporeal movable property, it may be wise to settle the nature of their legal status before they attain intelligence similar or superior to humans and become fully autonomous, thereby freeing themselves from human control. This could be easily done by placing them in a category of legal persons similar to corporations that are endowed with juridical personality and have the full enjoyment of civil rights." Furthermore, the Castels suggest that under certain circumstances a robot or an AI might even be liable under criminal law: "If a robot possesses the same attributes as a human, it should be treated as a human for the purpose of the criminal law. However, the crimes that it may commit and defenses it may use would be more limited." *ibid* at 38.

[178] *Ibid*. Similar ideas for registration technology were raised in regard to 3D printing. See Shlomit Yanisky-Ravid & Kennth S Kwan, "3D Printing the Road Ahead: The Digitization of Products When Public Safety Meets Intellectual Property Rights - A New Model" (2017) 38 Cardozo L Rev 921 [Yanisky-Ravid & Kwan].

[179] The Impact of AI on Canadian Law, *supra* note 176 at 37. It is interesting to note that the Castels point to the Charter's phrasing that does not restrict rights to humans, *i.e.*, persons: "Although the Charter does not mention specifically legal persons such as corporations, the interpretation of the words: 'Everyone', 'Every citizen', 'Any person', 'Every individual', 'Any member of the public', 'Anyone', 'Citizen of Canada' used in different sections of the Charter do not exclude them [robots and AI], although some of the rights by their very nature are not available to them." They contend that the words "everyone", "anyone", "any member of the public", and "every individual" are synonymous and can apply to AI and robots.

[180] *Criminal Code*, RSC 1985, c C-46, address only actions caused by human negligence. Further, the insurance system will have to make several changes as well since the current system is based on the human driver experience.

In the UK, the Science and Technology Committee of the House of Commons raised the call to "establish a RAS [Robotics and Autonomous Systems] Leadership Council."[181] Following the announcement, the House of Lords appointed a Select Committee on AI "to consider the economic, ethical and social implications of advances in artificial intelligence."[182] The committee has recently published its final report on April 2018 asserting that the UK is in a strong position to become a leading country in AI development offering several recommendations to mitigate AI risks and providing policy suggestions.[183]

The EU produced several policy papers further highlighted the need to establish a legal mechanism for AI.[184] In 2016, the European Parliament Committee on Legal Affairs urged the EU Commission "to consider creating a European agency for robotics and artificial intelligence to supply public authorities with technical, ethical and regulatory expertise" (a suggestion that the

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[181] UK, HC Deb (12 October 2017), vol 145, col 98. The UK House of Commons Report emphasizes the changes that progress in the field might induce, such as in employment, educational skills, and, obviously, law. Indeed, the prospect of robotics and AI invokes many legitimate concerns.

[182] The committee appointed by the House of Lords on 29 June 2017. See AI in the UK report, *supra* note 55 at 2.

[183] AI in the UK report, *ibid* at 126-138. Among the many issues, the committee expresses concern about using biased datasets to train AI, and recommends allocating funds to encourage the creation of tools to ensure the quality of datasets. In addressing labour AI disruptions, the committee supports government initiatives in developing adult training schemes. Further, the committee offers to "consider the adequacy of existing legislation to address the legal liability issues of AI and, where appropriate, recommend to Government appropriate remedies to ensure that the law is clear in this area. At the very least, this work should establish clear principles for accountability and intelligibility." In considering regulatory measures, the committee expresses reservations from "Blanket AI-specific regulation" and believes that existing regulation might suffice at this point.

[184] See EC, *A Digital Single Market Strategy for Europe* (2015), online: <eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52015DC0192>; EC, Commission communication on *Digitising the European Industry* (2016), online: <eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016DC0180>; EC, Commission communication on *Building a European Data Economy* (2017), online: <eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2017:9:FIN>, and finally: EC, *Mid-Term Review of the Digital Single Market Strategy (DSM) - a good moment to take stock* (2017), online: <ec.europa.eu/digital-single-market/en/content/mid-term-review-digital-single-market-dsm-good-moment-take-stock>. *GDPR* might also affect the usage of dataset for machine-learning algorithms. See EC, *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)*, OJ 2016, L119 [*GDPR*].

Castels are willing to see adopted in Canada as well).[185] Japan,[186] China,[187] Singapore,[188] Australia[189], Israel[190] and other countries have invested and are investing resources in emerging technologies, and have introduced regulatory changes concerning AI. It seems that all the key players in the world are interested in investigating AI's potential and coming up with the right AI policy.

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185 European Parliament Press Release, "Robots: Legal Affairs Committee calls for EU-wide rules" (12 January 2017), online: <europarl.europa.eu/news/en/news-room/20170110IPR57613/robots-legal-affairs-committee-calls-for-eu-wide-rules>. The committee approved MEP Mady Delvaux's report. See European Parliament, Committee on Legal Affairs, "Motion for a European Parliament Resolution with Recommendations to the Commission on Civil Law Rules on Robotics" (2015/2103(INL)), online <europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML%2BCOMPARL%2BPE-582.443%2B01%2BDOC%2BPDF%2BV0//EN> [The EU Parliament Report]. Following the European Parliament Resolution, the EU Commission has taken steps to address its recommendations and in June 2017 published its response reviewing the many legislative initiatives that highlight AI challenges including the *Digital Single Market Strategy* (2015); the Commission Communication on Digitising the European Industry (April 2016); the Communication on Building a European Data Economy (January 2017), and the mid-term review of the *Digital Single Market Strategy* (May 2017), online: <eu-nited.net/robotics/news-events/robotics-news/european-commissions-response-to-the-european-parliaments-resolution-on-civil-law-rules-on-robotics.html>.

186 In 2017, NEDO (New Energy and Industrial Technology Development Organization), which is a government organization and plays an important role in Japan's economic and industrial policies, published a report on AI policy – Japan, Strategic Council for AI Technology, *Artificial Intelligence Technology Strategy* (2017), online (pdf): <http://www.nedo.go.jp/content/100865202.pdf>. See also *New Robot Strategy* (2015), online (pdf): <meti.go.jp/english/press/2015/pdf/0123_01b.pdf>. As part of Japan's "Robotic Revolution" a Robotic Policy Office is to be established under the Ministry of Economy, Trade and Industry (METI) (1 July 2015), online: <meti.go.jp/english/press/2015/0701_01.html>.

187 On 20 July 2017, the China State Council issued guidelines on AI development as part of the "Next Generation Artificial Intelligence Development Plan" (China AI Plan). According to the press release, the Chinese government is going to focus on promoting trans-boundary research to connect AI with other areas (such as cognitive science, psychology, mathematics, and economics), developing a common technology system based on algorithms, data, and hardware, creating innovation platforms, and training more AI professionals. See "China issues guideline on artificial intelligence development" (20 July 2017), online: <english.gov.cn/policies/latest_releases/2017/07/20/content_281475742458322.htm>. The China AI Plan is available at <gov.cn/zhengce/content/2017-07/20/content_5211996.htm>. The plan is in Chinese but can translated to English using Google Translate.

188 The Singapore National Research Foundation (NRF) announced a 150 million Singaporean dollar investment over the next five years into a new national program to enhance the AI research in Singapore. See the press release at the NRF website <nrf.gov.sg/programmes/artificial-intelligence-r-d-programme>.

189 See e.g. the report concerning self-driving cars at footnote 22; Austl, Innovation and Science Australia, *Australia 2030 Prosperity Through Innovation: A Plan for Australia to Thrive in a Global Innovation Race* (Canberra: Australian Government, 2017), online (pdf): <https://www.industry.gov.au/sites/g/files/net3906/f/May%202018/document/pdf/australia-2030-prosperity-through-innovation-full-report.pdf>

190 The Science and Technology Committee at the Knesset (Israel parliament) held a discussion on AI developments on 4 June 2018. Prior to the discussion, the Knesset's Research and Information Center published a special report on AI. See Roy Goldsmith, *Information about AI* (The Knesset, 3 June 2018), online (pdf): *Knesset's Research and Information Center* <knesset.gov.il/mmm/data/pdf/m04227.pdf>.

First, why do we need an AI policy to begin with?[191] Why do governments need to invest in and support areas that are currently driven efficiently by large and well-funded corporations such as Google,[192] Facebook,[193] Microsoft,[194] Uber and others? Indeed, there are risks. Although, as most scientists have indicated, far less imminent than the dangers posed by North Korea, Iran, the war on terror, and global warming, especially since there is no consensus among scientists that AI might even pose any significant risks in the future. Why should we not allow the market to regulate itself and adopt its own ethical guidelines?

One reason is that the fact that there are larger risks does not mean we should avoid lower level risks posed by AI, algorithms, and machine-learning technology. Another reason, as Ryan Calo suggested, is that the industry might not be willing to adopt policies or guidelines *unless* forced to do so.[195] The market is not always the best regulator and Adam Smith's "invisible hand" cannot provide the assurances of safety required by the public. This is especially true in markets where profit-maximizing interests foster fake news and foreign-government interference in the democratic process. Furthermore, in areas in which there is a higher probability of risk, there is an even stronger argument for imposing government restrictions. True, given certain liability factors – the current laws shift the responsibility to damages inflicted by technology to the programmers

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[191] Ryan Calo has argued that even the use of the term "policy" in regard to AI is controversial. The Berkman Klein Center at Harvard has chosen to describe policy initiatives concerning AI as an "Ethics and Governance of Artificial Intelligence Fund." See Calo – AI Policy, *supra* note 42. Indeed, AI poses important ethical questions as well. However, I share Calo's opinion that "[e]thics as a construct is notoriously malleable and contested …" and hard to enforce while "[p]olicy—in the sense of official policy, at least – has a degree of finality once promulgated." *Ibid* at 408.

[192] See Google's AI mission – ai.google. Google's mission as described on the website is to apply research "to real world problems to create smarter, more useful technology and help as many people as possible."

[193] Mark Zuckerberg has recently introduced the AI assistant Jarvis; Facebook's research focuses on AI as well. See <research.fb.com/category/facebook-ai-research-fair>.

[194] Microsoft has been an important contributor to the development of AI.

[195] Calo – AI Policy, *supra* note 42 at 408: "They are going to prefer ethical standards over binding rules for the obvious reason that no tangible penalties attach to changing or disregarding ethics should the necessity arise."

or owners – there is a strong incentive for companies to self-regulate.[196] However, the fact that several "big players" are involved in different countries makes this goal of self-regulation an even bigger challenge. On a more practical level, each company might come up with a different set of guidelines and ethical codes for its own agenda and business vision, creating an AI "Tower of Babel". Governments should not leave the policy field in the hands of private corporations.

For some, AI policy means AI laws. I do not believe that this is the right approach. I share Calo's opinion that "[i]t may not be wise or even feasible to pass general laws about artificial intelligence at this early stage."[197] Imposing AI laws and regulations, as some reports suggested, can create distraction and uncertainty.[198] However, that does not mean that we should avoid *any* government intervention. Crafting an AI policy that can foster the positive effects AI might have on society while trying to avoid the negative effects is wise and timely. As Calo offers "[p]olicy conveys the necessity of exploration and planning, the finality of law, and the primacy of public interest without definitely endorsing or rejecting regulatory intervention."[199]

Policy is the line between laws and regulations and ethical codes and guidelines. It can signal to the public and industry where the government is hoping to get without imposing restrictive rules at first. Though policy might eventually translate into laws, there are no guarantees that a particular policy will be adopted. Further, policy discussions among the government,

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[196] In a similar manner to the way effective corporate governance can shield corporations against criminal procedures. Further, as professor Vaver suggested, companies can insulate themselves from liability by creating offshore shell companies or the equivalent one-ship companies as occurs in the marine industry.
[197] The AI in the UK report, *supra* note 55 at 137 concurs: "Blanket AI-specific regulation, at this stage, would be inappropriate. We believe that existing sector-specific regulators are best placed to consider the impact on their sectors of any subsequent regulation which may be needed."
[198] Ontario's AI Opportunity Report, *supra* note 28 at 22.
[199] Calo – AI Policy, *supra* note 42 at 410.

academia, consumers, NGOs and the industry is the most efficient way to design careful measures that can allow for the development of a given field without endangering public interests.[200]

Calo offers a roadmap for AI policy. In doing so, he discusses challenges in several domains in which he believes attention is required, including justice and equity, use of force and safety, privacy, and employment. Justice and equity is the capacity to "program" or "translate" human values, such as fairness, transparency, accountability, and other moral considerations to algorithms and AI systems.[201] The concepts of justice, equity, and other abstract forms of thinking are what make humans unique. Developing a set of moral and ethical considerations for AI programs has great potential in eliminating human bias and inequality.

There are several indications of design bias in programs "from a camera that cautions against taking a Taiwanese-American blogger's picture because the software believes she is blinking […] to a translation engine that associates the role of engineer with being male and the role of nurse with being female."[202] Since minorities and other disadvantaged groups are not the main concern of the private sector, there is a high likelihood that without government intervention, structural bias toward these groups will "echo" within AI programs.[203] This brings me to the first rule in shaping AI policy: act wherever and whenever there is a low probability that the private

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[200] I do not share the idea that we need to enact laws for AI at the current time. We should discuss the many possible directions that we should take in due course, but imposing strict rules is not wise. As we all know, laws and technology do not coexist in harmony and law tends to lag behind technology. Eventually, I fear that enacting laws might prove unwise and unnecessary. See Lyria Bennett Moses, "Agents of Change: How the Law 'Copes' with Technological Change" (2011) 20 Griffith L Rev 764.

[201] Alex Campolo et al, *The AI Now Report: The Social and Economic Implications of Artificial Intelligence Technologies in the Near Term* (22 September 2016), online (pdf): <artificialintelligencenow.com/media/documents/AINowSummaryReport_3_RpmwKHu.pdf>.

[202] Calo – AI Policy, *supra* note 42 at 411.

[203] This can happen through the use of biased data: "[T]he designs may be using models trained on data where a particular demographic is underrepresented and hence not well reflected. More white faces in the training set of an image recognition AI means the system performs best for Caucasians." *Ibid* at 412.

sector will address an issue by itself. One way the government can affect these concerns is by policing the use of data – the fuel and currency of AI.[204]

Future policy challenges include developing rules that can assist in decision-making processes, anticipating AI programs that may eventually be able to make certain decisions and even replace parts of our legal system. Investing resources in AI decision-making capabilities is an important goal for governments.[205] As with bias and inequality, it initially seems complex and daunting to imagine ways in which AI systems could replace human judges. However, this is not necessarily true. Ben Alarie has predicted that the legal standards that currently uphold complex sets of rules will be replaced by AI that offers greater reliability, accessibility, and predictability.[206]

The current legal system is based on "valve concepts" such as good faith, reasonableness, probability and other concepts that are shaped and decided by judges and lawyers. AI might not require these set of ambiguous concepts and develop a more reliable and predictable way to analyze a legal case and make decisions. In fact, the AI "judge" might provide a solution to one of the most challenging struggles in the legal system – equal sentences and damages. Obviously, not all decision making can rely on AI, and "[c]ertain decisions, such as the decision to take an

[204] Data are indeed a significant concern for IP laws, as I shall develop in the coming chapters. As a recent discussion draft by the Canadian Competition Commissioner suggests "[d]ata are increasingly becoming critical input in certain markets and may serve as a significant barrier to entry." Canadian Competition Bureau, "Big data and Innovation: Implications for competition policy in Canada: Draft Discussion Paper" (2017) at 15, online (pdf): <competitionbureau.gc.ca/eic/site/cb-bc.nsf/vwapj/Big-Data-e.pdf/$file/Big-Data-e.pdf>. On 19 February 2018, the Canadian Competition Bureau published its key policy paper for big data and innovation in Canada. See Canada, Competition Bureau, *Big data and innovation: key themes for competition policy in Canada* (Ottawa, 19 February 2018), online (pdf): <competitionbureau.gc.ca/eic/site/cb-bc.nsf/vwapj/CB-Report-BigData-Eng.pdf/$file/CB-Report-BigData-Eng.pdf>.

[205] See Joel Tito, "Destination Unknown: Exploring the Impact of Artificial Intelligence on Government" (2017) Centre for Public Impact Working Paper, online (pdf): <publicimpact.blob.core.windows.net/production/2017/09/Destination-Unknown-AI-and-government.pdf>. The report outlines four areas in which AI can improve the functioning of governments, in both executive function and policy-making: predictive analysis (assessing the value of a given outcome and explaining predictions of known and unknown observations); detection (identifying patterns in massive databases; computer vision (collection and analysis of information obtained from visual sources); and natural language processing (processing and assessing audio and text data).

[206] Alarie, *supra* note 12 at 447.

individual off of life support, raise fundamental concerns over human dignity and thus perhaps cannot be made even by objectively well-designed machines."[207]

Finding a way to teach AI abstract concepts that humans find difficult to define (such as the concept of justice or good faith) might be a misguided approach.[208] However, creating a set of rules that AI can follow and embracing AI capabilities to analyze information very quickly is a good start. Government policy is important in managing these projects, making sure that rules are based on core societal values, creating boundaries and restrictions preventing bias and inequality, providing funding, and coordinating efforts between key players like academia, the public and private sectors, and initiatives in other countries. As Calo opines, "The end game of designing systems that reflect justice and equity will involve very considerable, interdisciplinary efforts and is likely to prove a defining policy issue of our time."[209]

The second domain in which policymaker considerations are required is human safety and the use of force. AI may eventually make vital decisions that can affect life, such as the decision to shoot a "hostile" target by automated drones or for a self-driving vehicle to choose between hitting a pedestrian or crashing into a tree. Indeed, these decisions, while similar, are different in many ways. There is a near consensus internationally that "kill" decisions should always be reserved for humans and that no AI should be allowed to make these decisions.[210] Jean-Gabriel and Matthew Castel call for international intervention in developing measures to prevent the

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[207] Calo – AI Policy, *supra* note 42 at 414.
[208] Though, we could suggest pointers and factors that AI systems would analyze, much like many cases are decided today by "inferior" human judges. See e.g. *Samuel Smith Old Brewery (Tadcaster) v Lee (t/a Cropton Brewery)*, [2011] EWHC 1879 (Ch) at 118. In the Yorkshire Bitter trade mark case, Mr. Justice Arnold suggesting factors in order to determine honest practice (that is no different from determining good faith).
[209] Calo – AI Policy, *supra* note 42 at 415.
[210] *Ibid* at 415-417. See also Heather M Roff & Richard Moyes, "Meaningful Human Control, Artificial Intelligence and Autonomous Weapons" (Paper prepared for the Informal Meeting of Experts on Lethal Autonomous Weapons Systems, UN Convention on Certain Conventional Weapons, 11-15 April 2016), online (pdf): <article36.org/wp-content/uploads/2016/04/MHC-AI-and-AWS-FINAL.pdf>; See also J G Castel & M Castel, *supra* note 8.

production and use of partially or fully automated machines in both civil and international armed conflicts.[211] As a policy matter, they suggest that AI robots and programs should incorporate legal and ethical values based on international humanitarian law.[212]

It is reasonable to assume that AI programs will be integrated into most computer systems that are currently affecting and regulating our day-to-day lives. AI will increasingly be deployed in airplanes, cars, and various means of transportation (including smart drone delivery); controlling our homes' elevators, cleaning, and heating functions; tracking our moves and caring for us. Certain professions such as doctors, lawyers and accountants (all of whom are currently heavily regulated) will change or adapt in concert with AI technology. These plausible scenarios demonstrate the great potential AI has in preventing accidents and creating a safer and better environment for us all.

AI technology can detect dangers, as well as alert citizens and law enforcement to them. However, with this great potential comes risk. AI cyberattacks, for instance, pose a threat. When day-to-day life is monitored and operated through AI, these systems are ripe for manipulation in ways that can endanger users unless certain measures are put in place by governments. Further, as Calo points out, "These applications raise additional questions concerning the standards to which AI systems are held and the procedures and techniques available to ensure those standards are

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[211] See also J G Castel & M Castel, *supra* note 8 at 5: "Lethal autonomous weapons systems raise important issues. For instance, could unmanned partially or fully autonomous robots and drones reliably separate enemy soldiers or terrorists from civilians on the battlefield or elsewhere? Would their lack of human emotions prevent them from showing mercy or compassion when facing wounded or surrendering human soldiers or civilian victims? So far, scientists, computer engineers and programmers have not yet succeeded in developing software or source codes that contain new cognitive modules and skills enabling robots to feel emotions essential to our humanity."

[212] J G Castel & M Castel, *supra* note 8 at 5; Pascale Fung, "Robots with Heart" (2015) 313 Scientific American 60. I doubt whether this suggestion is possible in the future, let alone today. In many countries, the concept of humanitarian law is no more than a polite recommendation. If a country were to acquire AI capabilities, I doubt it would decide to limit its capabilities. However, this discussion is not within the scope of my dissertation.

being met."[213] Establishing safety standards is something governments do all the time in domains like food safety, drug approval, traffic rules, and manufacturing.[214] The same could apply to AI.

In the AI policy debate, there are voices arguing that no regulation is needed since, as the Subcommittee on Digital Commerce and Consumer Protection Chairman expressed concerning self-driving cars, "[This] technology has the potential to dramatically improve safety on our nation's roadways and that is one of the most important reasons to advance the bills we have under consideration today."[215] However, "safer than humans" is not good enough.[216] Governments should set basic rules for AI-based systems and, even more urgently, establish how to regulate current technology. For instance, the government might decide to restrict AI technology to specific areas for trials or pilot runs.

A comprehensive proposal that has emerged recently in this area is that of establishing an independent oversight body – a National Algorithm Safety Board. The Board would have three primary duties: "planning oversight, continuous monitoring by knowledgeable review boards using advanced software, and a retrospective analysis of disasters."[217] Anyone looking to develop and deploy a major new algorithmic system would be required to submit an algorithm impact statement to the Board. These statements would include "[s]tandard questions about who the

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[213] Calo – AI Policy, *supra* note 42 at 417.
[214] There are other examples for standardization on a global scale. Take the International Organization for Standardization (ISO) model for example, See <iso.org/about-us.html>. ISO is not a government organization, but it is recognized as a leading institute worldwide. According to its website, ISO "have members from 162 countries and 783 technical bodies." ISO might be an alternative model for AI standardization, which is not regulated/enforced by countries, but is accepted on a voluntary consensus-based by the international community.
[215] Opening Statement of Chairman Greg Walden Subcommittee on Digital Commerce and Consumer Protection Self-Driving Vehicle Legislation (27 June 2017), online (pdf): <docs.house.gov/meetings/IF/IF17/20170627/106182/HHRG-115-IF17-MState-W000791-20170627.pdf>.
[216] Calo – AI Policy, *supra* note 42 at 417
[217] Ben Shneiderman, "The Dangers of Faulty, Biased, or Malicious Algorithms Requires Independent Oversight" (2016) 113:(48) PNAS 13539, online (pdf): <pnas.org/content/113/48/13538.full.pdf>.

stakeholders are, and what the impacts might be," which would "ensure that implementers think carefully about potential problems and then propose reasonable solutions."[218]

Being transparent with the Board in advance of deployment helps to minimize concerns about having later to de-code the algorithm and its built-in values. It may also be prudent to require black-box testing before approval.[219] Continuous monitoring would follow the initial approval and would be undertaken by knowledgeable inspectors. This ongoing oversight is similar in theory to the idea of safety inspections in food processing facilities. This would be possible and meaningful because the Board would have approved the algorithm before it was delivered to market, as well as inspected and tested the algorithm through its continuous monitoring program. The Board could then work with the algorithm's owner (or any other responsible parties) in order to conduct an inquiry or investigation into the harm that was caused. Another example was recently presented by Matthew Scherer. Scherer argues for the creation of what he calls an *Artificial Intelligence Development Act* to be administered by a government agency that can certify and label AI systems as safe.[220]

The technological changes will not happen in days (or months). A transition period in which self-driving vehicles will share the roads with regular vehicles is expected. Thus, it is important to address the effect of the transition period as well. If safety standards are to be imposed on AI technology (including self-driving cars, drones, home assistant robots, *etc*.), the government

[218] *Ibid*.
[219] Ontario's AI Opportunity Report, *supra* note 28 at 22-23, echoes this idea offering to create a regulatory sandbox to incentivize domestic innovation: "Companies acting within the sandbox would not need to contend with heavy regulatory burdens while still in their infancy and potentially unprofitable."
[220] Matthew U Scherer, "Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, And Strategies" (2016) 29:2 Harv JL & Tech 353 at 394 [Scherer, Regulating AI].

must establish a way to verify whether those standards are met. This process would comprise government supervision and certification as well as testing itself.[221]

A different set of policies should be developed to address privacy concerns. Privacy, or the lack thereof, has become a significant concern as people have become more involved on the Internet over the past two decades. We now perform many of our day-to-day activities via the Internet, from using social networks to post pictures (that can pinpoint our exact location) to buying products on Amazon and using GPS-based applications to drive. All these applications and online systems use our data. This availability of data is what enables technological development: machine learning cannot function without access to data. However, the fact that data are so important to the development of AI does not mean that we should not find ways to secure the use of our data and reserve *some* level of privacy.

The acceleration of AI technology will play an essential role in the privacy discussion. As Calo suggests, two main issues threaten our privacy: pattern recognition and access to data. AI can identify patterns that humans cannot. These capabilities, which we can expect to improve in the future, pose a significant risk to our privacy and threaten to diminish it almost entirely, making everything public to some extent. Even if we allow AI to use information that is shared freely, such as grocery lists or locations, AI pattern recognition might reveal sensitive information about us. "With enough data about you and the population at large, firms, governments, and other institutions with access to AI will one day make guesses about you that you cannot imagine – what

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[221] The AI in the UK report, *supra* note 55 at 138, recommends monitoring government's policies closely "and react to feedback from academia and industry where appropriate."

you like, whom you love, what you have done"[222] – though, as indicated above, this technology could also be used for positive purposes like security and making us all safer.[223]

Another concern is with access to data and how data are prioritized. Simply put, the ability of machine-learning programs to find solutions to an issue is dependent upon the availability and quality of the data it has access to. As discussed earlier, data can reflect biases and inequality. Thus, regulating the amount of data, the quality of the data, and the priority with which organizations can access data are paramount.[224] Given that governments control vast amounts of data, the decision of access is first and foremost a policy question.[225]

From a public policy perspective, governments should adapt guidelines and regulations that designate the usage of data for specific causes, provide restrictions to preserve the privacy of its citizens, and define the scope of fair data usage.[226] In addition, big datasets may also affect the

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[222] Calo – AI Policy, *supra* note 42 at 421; See also Tal Zarsky, "Transparent Predictions" (2013) 4 U Ill L Rev 1503. Recently, Israel Private Protection Authority (PPA) has examined the broadcasting companies and streaming services in Israel (including Netflix). Following the investigation, PPA published its opinion concluding that the information that is gathered by the broadcasting companies could, potentially, reveal sensitive information about the viewers and is considered "data" under the Privacy Act and regulations. In consequence, PPA instructed the companies to secure the information, and to ask for the user/viewer consent for collecting data. See Israel, Private Protection Authority, "Statement Concerning Viewers Data by Television Companies" (22 April 2018), online: <gov.il/he/Departments/news/_1tv_supervision>.

[223] Ryan Calo, "Can Americans Resist Surveillance?" (2016) 83 U Chicago L Rev 23. Calo discusses the legal challenges posed by the availability of data to government: "If everyone in public can be identified through facial recognition, and if the 'public' habits of individuals or groups permit AI to derive private facts, then citizens will have little choice but to convey information to a government bent on public surveillance." Calo – AI Policy, *supra* note 42 at 18.

[224] Amanda Levendowski, "How Copyright Law Can Fix Artificial Intelligence's Implicit Bias Problem" (2018) 93:2 Wash L Rev 579.

[225] I am aware of the risks and challenges pose by mega companies (such as Google, Facebook, Apple, Amazon, Microsoft, *etc*.). These companies hold the key to significant amount of data that can affect (in positive or negative ways) the development of technology and our privacy. As part of developing an effective AI policy, the governments ought to consider if and how to regulate this so-called "private" data. The recent involvement of Russia in the US presidential elections has strengthened my position regarding the necessity of some level of regulation over these mega companies. I further discuss data barriers in Part III.

[226] Obviously, this issue raises subsequent questions regarding the way governments can incentivize organizations to use data for public good. Providing free access to government data for specific organizations or companies could prove to be a good policy.

economy: as data are the fuel of AI development, data are worth a lot of money, and therefore the government can leverage it as a means of funding.[227]

One attempt to regulate data was implemented recently with the *EU General Data Protection Regulation* (*GDPR*), which came into force on May 2018.[228] However, there are some difficulties with the *GDPR*. First, it seems that many experts in the industry do not understand some of the rules relating to the usage of data.[229] Second, the *GDPR* is forcing companies to explain the algorithms and AI decision process, which is not always possible.[230] Machine learning is designed to "think on its own" by developing new methods and approaches for a given task.[231]

The next area that requires government attention is employment. As discussed in the first chapter of this part,[232] technological advances in AI will affect markets. As we learned from the Industrial Revolution and the Internet, we should expect this to shake the core foundations of current professions and create new ones in the process. The AI revolution might happen in stages. In the first stage, AI and machine-learning programs will replace humans in technical professions

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[227] The Impact of AI on Canadian Law, *supra* note 176 at 48. The Castels address privacy concerns in Canada, stating that "[n]either the federal nor the provisional or territorial legislation addresses directly the situation of AI machines as collectors, recipients or users of personal information which defines by s.2(1) of the PIPEDA [Personal Information Protection and Electronic Documents Act] as 'information about an identifiable individual'." They proposed an interesting suggestion, *ibid* at 49: "Before AI machines are sold … robotic engineers and programmers should be required to insert in their software an algorithm with a code of conduct that contains Canadian privacy standards and instructions to respect any personal information that they have acquired." Easier said than done. One of the most complex issues is how to create ethical rules and standards for AI and robots.
[228] *GDPR*, *supra* note 184.
[229] For example, art 22 "Automated individual decision-making including profiling."
[230] Cliff Kuang, "Can A.I. Be Taught to Explain Itself?" (21 November 2017), online: *The New York Times* <nytimes.com/2017/11/21/magazine/can-ai-be-taught-to-explain-itself.html?hp&action=click&pgtype=Homepage&clickSource=story-heading&module=mini-moth&region=top-stories-below&WT.nav=top-stories-below>.
[231] See also Lehr & Ohm ,*supra* note 137.
[232] See footnote 27 above.

(or certain elements of those professions).[233] However, we can expect subsequent advancements to speed up the rate of change.

Eventually, as Calo predicts, "[V]ery few sectors will remain untouched."[234] In order to better prepare for the coming changes, governments should allocate resources and develop specific programs in technology, computer science, *etc*. Further, these programs should be employed on three different levels: blue-collar workers in areas in which there is higher probability to be affected in the coming decades; universities and other higher education institutions; and even elementary schools. These conclusions are shared by almost all the reports I have surveyed above, the most recent one in Ontario.[235]

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[233] Pasquale points out to the differences between human professionals and its expected AI/Robitc substitutes. According to Pasquale, there is a major difference between human "holism" – the ability to integrate facts and values to respect the demands of a specific case/event - and the ability to perform tasks by automated AI systems. Pasquale argues that, as a result, the "medical care" and "education" we will receive from AI or Robots is expected to be inferior to a human skilled professional. See Frank A Pasquale, "Professional Judgment in an Era of Artificial Intelligence and Machine Learning" (2019) 46(1) boundary 2, 73.
[234] Calo – AI Policy, *supra* note 42 at 426.
[235] Ontario's AI Opportunity Report, *supra* note 28.

1.3 LEGAL PERSONHOOD FOR AI

*"**Siri, do you believe in God?***

Humans have religion. I just have silicon.

Siri, I insist, do you believe in God?

I would ask that you address your spiritual questions

to someone more qualified to comment.

Ideally, a human."

Well, Siri might have a point, or does she?

The debate regarding the personhood of non-humans is well-trodden ground.[236] The notion of considering non-humans for legal rights goes back to the Middle-Ages, when churches were subject to legal rights and animals were held accountable for their "criminal" behaviour.[237] Considering AI to have legal personhood might imply that a similar status ought to be granted to

[236] Lawrence B Solum, "Legal Personhood for Artificial Intelligence" (1992) 70 NCLR 1231 at 1239. Shlomit Yanisky-Ravid, "Generating Rembrandt: Artificial Intelligence, Copyright, and Accountability in the 3A Era - The Human-like Authors Are Already Here - A New Model" (2017) 2017 Mich St L Rev 659 [Yanisky-Ravid, Generating Rembrandt]. See also John C Gray, *The Nature and Sources of the Law* (Boston: Beacon Press, 1963). Alan P Herbert once sued a computer in the fictional case of *Haddock v The Generous Bank Ltd, Computer* 1578/32/W1, published in Alan P Herbert, *Misleading Cases in the Common Law* (London: Methuen, 1927).

[237] Kristin Andrews et al, eds, *Chimpanzee Rights: The Philosophers' Brief* (New York: Routledge, 2019); Mylan Engel Jr & Gary L Comstock, eds, *The Moral Rights of Animals* (Lexington Books, 2016). Recently, animal's rights became the focus of the legal community after a series of photos were taken by a monkey. In *Naruto v Slater*, No 3:2015cv04324 (ND Cal 2016) District Judge William Orrick rejected Naruto's claims for copyright protection in "his" selfie pictures stating that "Naruto is not an 'author' within the meaning of the Copyright Act", *ibid* at 6. On March 2016, People for the Ethical Treatment of Animals (PETA) filed a notice to appeal the District Court's decision. Following the parties' settlement attempts, the Ninth Circuit denied the motions to vacate the case and ruled in favour of Slater finding that "this monkey – and all animals, since they are not human – lacks statutory standing under the Copyright Act", *Naruto v Slater,* 2018 US App LEXIS 9563 (9th Cir 2018). An appeal to rehear the case was denied. See also the US case on the right of free speech for Blackie the Talking Cat, *Miles v City Council of Augusta, Georgia*, 710 F (2d) 1542 (11th Cir 1983). See also David Vaver, *Intellectual Property Law: Copyright, Patents, Trade-marks*, 2nd ed (Toronto: Irwin Law, 2011) at 115, footnote 328 [Vaver]. Israel's High Court of Justice considered the legal status of animals in the *Palestine Mountain Gazelle* motion to dismiss a District Outline Plan for the city of Jerusalem. "Appellant 6" – the Palestine Mountain Gazelle – joined the other human appellants in arguing that the new outline would harm the existence of the Gazelles. Similarly to the Ninth Circuit opinion in Naruto, Justice Elyakim Rubinstein held that an animal has no legal standing in court and urged the parties to amend the motion accordingly. See Israel, HCJ 466/05 *Raz v National Planning Committee* (Nevo Publications, 2005).

other subjects such as animals,[238] or trees.[239] However, this conclusion does not necessarily follow. There are many differences between animals and AI, the most prominent being that AI resembles human intelligence far more than animal intelligence. In fact, AI poses many human qualities and abilities and, in some aspects, even superior to human intelligence.

There are three main objections to the recognition of AI legal rights: the "only humans should be given personhood rights"; the "critical component"; and the "AI is property".[240]

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[238] Solum, *supra* note 236 at 1261. See also Gunther Teubner, "Rights of Non-Humans? Electronic Agents and Animals as New Actors in Politics and Law" (2006) 33 J L & Soc'y 497; Cass R Sunstein, "Can Animals Sue?" in Cass R Sunstein & Martha C Nussbaum, eds, *Animal Rights: Current Debates and New Directions* (New York: Oxford University Press, 2004) at 251; Laurence H Tribe, "Ten Lessons Our Constitutional Experience Can Teach Us About the Puzzle of Animal Rights: The Work of Steven M. Wise" (2001) 7 Animal L 1; Jane Goodall & Steven M Wise, "Are Chimpanzees Entitled to Fundamental Legal Rights?" (1997) 3 Animal L 61. In the past century, several cases reflected on the rights of cats, dogs, and other animals to be considered as the legal beneficiaries of a trust (the "Terrier Trusts" cases providing several amusing examples). In *Dean v Stevens*, 41 Ch Div 552 [1889] the English Court upheld a trust for animals. In *Kelly, Re, Cleary v Dillon*, [1932] Ir R 255 at 256, a testator stated the following in his will: "I leave one hundred pounds sterling to my executors and trustees for the purpose of expending four pounds sterling on the support of each of my dogs per year, and I direct that my dogs be kept in the old house at Upper Tullaroan aforesaid. Should any balance remain in the hands of my trustees on the death of the last of my dogs I leave same to the Parish Priest for the time being of the Parish of Tullaroan for masses for the repose of my soul and the souls of my parents, brothers and stepfather." In deciding to allow the dog's "allowance", the court remarked, *ibid* at 260, that "[i]t was suggested that the last of the dogs could in fact not outlive the testator by more than twenty-one years. I know nothing of that. The Court does not enter into the question of a dog's expectation of life. In point of fact neighbour's dogs and cats are unpleasantly long-lived; but I have no knowledge of their precise expectation of life." See also "Obiter Dicta" (1938) 7 Fordham L Rev 286 at 287; *Baker v Harmina*, 2018 NFCA 15 at para 12 (holding that "[i]n the eyes of the law a dog is an item of personal property.").

[239] Chirstopher D Stone, "Should Trees Have Standing? – Toward Legal Rights for Natural Objects" (1972) 45 S Cal L Rev 450. Stone "quite seriously" proposed to give "legal rights to forests, oceans, rivers and other so-called 'natural objects' in the environment-indeed, to the natural environment as a whole"; Chirstopher D Stone, *Should Trees Have Standing?: Law, Morality, and the Environment* (New York: Oxford University Press, 2010). Last year, Local Māori and the government of New Zealand signed a treaty granting the sacred mountain Taranaki legal rights. See Andrew Little, Minister of Justice (and Minister for Treaty of Waitangi Negotiations) statement: "The legal personality requirement recognises the mountain's status in a similar approach taken with Te Urewera and Te Awa Tupua Whanganui River as all Crown-owned land within the National Park will be vested in a legal personality." Andrew Little, "Landmark Day for Taranki Maunga" (20 December 2017), online: <beehive.govt.nz/release/landmark-day-taranaki-maunga>.

[240] I shall address the prospects of allocating copyright to non-human authors in Part III. Indeed, there are much to discuss concerning copyright for non-humans. Both Berne and Rome conventions (as well as the *WCT* and the *WPPT*), referred to people who are "citizens" or "nationals". However, I do believe that if we allocate, as the Castels, The Impact of AI on Canadian Law, *supra* note 176, suggested, AI legal or citizens' rights, these limitations might be resolved.

1.3.1 Only Natural Humans Deserve Legal Rights

The first is the most simple and straightforward: only natural human beings deserve to be recognized as humans.[241] AIs are not humans. Therefore, they do not deserve equal human rights. However, we do award legal rights to non-humans: corporations, for example, are legal entities.[242] It seems that this argument takes an anthropocentric approach: "We are humans. Even if AIs have all the qualities that make us moral persons, we shouldn't allow them the rights … because it isn't in our interest to do so."[243] Lawrence Solum argues that this statement "is akin to American slave owners saying that slaves could not have constitutional rights simply because they were not white or simply because it was not in the interests of whites to give them rights."[244] Similarly, in English law, up until the passing of the *Married Women's Property Act 1882*, married women were

[241] According to legal rights granted to all humans according to international treaties. *The Universal Declaration of Human Rights of 1948*, 10 December 1948, UN, art 6; 16 of the *International Covenant on Civil and Political Rights of 1966*, 19 December 1966, 999 UNTS 171 art 16 (entered into force 23 March 1976, accession by Canada 19 May 1976) [ICCPR], state that "[e]veryone has the right to recognition everywhere as a person before the law." This statement is part of customary international law.

[242] Allocating legal rights to corporations is justified on a moral basis as well. Peter A French, "The Corporation as a Moral Person" (1979) 16:3 Am Phil Q 207. Koops, Hildebrandt and Jaquet-Chiffelle provide the following observation on French philosophical approach: "French distinguishes between metaphysical, moral, and legal persons, pointing out that for many authors legal personhood depends on metaphysical and/or moral personhood. Obviously, current positive law does not agree with this position, since no serious argument can be made that a ship or a trust fund is either a metaphysical or a moral person." I share their conclusion that "legal personhood is attributed to enable an entity to act in law (e.g., to create legal consequences) and to be held accountable for its actions, while also protecting the entity itself from being equated with the role it plays. Currently, all entities besides humans and those legal persons recognised by law are considered to be legal objects. This framework also applies to animals, which are treated as objects of the rights of their owners in private law, despite an ongoing movement by animal law activists." Bert-Japp Koops, Mireille Hildebrandt & David-Oliver Jaquet-Chiffelle, "Bridging the Accountability Gap: Rights for New Entities in the Information Society?" (2010) 11:(2) Minn J L Sci & Tech 497 at 517. Koops, Hildebrandt and Jaquet-Chiffelle conduct an extensive review of the literature to examine arguments for and against legal personhood for non-humans.

[243] Solum, *supra* note 236 at 1260.

[244] *Ibid* at 1261; Stone, *supra* note 239 at 453-454. *Contra* Joanna J Bryson, "Robots Should Be Slaves" in Yorick Wilks, ed, *Close Engagements with Artificial Companions: Key social, Psychological, Ethical and Design Issue* (John Benjamins Publishing, 2010) at 63-74. Bryson argues that there is no reason to consider robots as persons: "[C]ommunicating the model of robot-as-slave is the best way both to get full utility from these devices and to avoid the moral hazards mentioned in the previous sections … Our task is to ensure that the majority of the population understands that robots are just machines, and that one should spend money and time on them as is appropriate to their utility, but not much more." Similar arguments can be made concerning any AI form.

considered subordinate to their husbands' will under the couverture doctrine.[245] Christopher Stone observed in his 1972 paper on legal rights for natural objects: "Throughout legal history, each successive extension of rights to some new entity has been, theretofore, a bit unthinkable. We are inclined to suppose the rightlessness of rightless 'things' to be a decree of Nature, not a legal convention acting in support of some status quo."[246]

Being human is not an *essential* condition for legal rights. In fact, legal personhood is attributed to funds, associations, and even ships.[247] Moreover, this argument does not consider the probability of cyborg and synthetic biological applications of AI, in which AI technology might not stand alone. There is a chance that AI technology will be integrated into humans, creating new entities possessing both human organs and AI-robotic parts.

1.3.2 The Critical Component Argument

The "missing something" objections claim that AI lacks a certain component (X) that is essential for personhood, and since no AI can possess X, no AI can qualify for personhood rights. The fact that AI can learn how to demonstrate X (*i.e.*, can learn how to simulate X) cannot be satisfactory

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[245] Bridget Hill, *Women*, *Work & Sexual Politics in Eighteenth-century England* (Montreal, PQ: McGill-Queen's University Press, 1994). *The Married Women's Property Act 1882*, (UK) 45 & 46 Vict Ch 75.

[246] Stone, *supra* note 239 at 453. He adds at 455: "The fact is, that each time there is a movement to confer rights onto some new 'entity,' the proposal is bound to sound odd or frightening or laughable. This is partly because until the rightless thing receives its rights, we cannot see it as anything but a thing for the use of 'us'- those who are holding rights at the time."

[247] Marguerite Hogan, "Standing for Nonhuman Animals: Developing a Guardianship Model from the Dissents in Sierra Club v. Morton" (2007) 95 Cal L Rev 513 at 522; Koops, Hildebrandt & Jaquet-Chiffelle, *supra* note 242 at 499-500. See also *Tucker v Alexandroff*, 183 US 424 at 438 (1902): "A ship is born when she is launched, and lives so long as her identity is preserved. Prior to her launching, she is a mere congeries of wood and iron an ordinary piece of personal property…In the baptism of launching, she receives her name, and from the moment her keel touches the water, she is transformed, and becomes a subject of admiralty jurisdiction. She acquires a personality of her own; becomes competent to contract, and is individually liable for her obligations, upon which she may sue in the name of her owner, and be sued in her own name. Her owner's agents may not be her agents, and her agents may not be her owner's agents."

for the attribution of personhood.[248] Take intentionality, for example. We can claim that intentionality (in the philosophical sense – the quality of aboutness) is a crucial element of personhood. AI would not be able to express intentionality. "AI's verbal behavior would not be about anything; the AI's words would have no meaning."[249] These ideas go back to Greek philosophy and Plato's tripartite theory of the soul.[250] However, this is a theological discussion and has no place in a secular society. Legal rights should be based on public policy justifications.

Further, regarding consciousness and intentionality, we cannot assume that AIs will not be able to develop such elements in the future, or at least convince us that they possess such elements.[251] Consciousness could be explained as the ability to recognize things: "We do not know what taste or smell means for any individual human, but we can recognize it by connecting it to an existing symbol."[252] Harari links consciousness to feelings and suggests that in the future we might be able to understand consciousness in such a way that AIs could develop it.[253]

On the other hand, as Robert Ford said to Bernard Lowe in the HBO series Westworld: maybe "we cannot define consciousness because consciousness does not exist."[254] There is merit in assuming that humans may not be able to determine if an AI is conscious since humans may not

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[248] Solum, *supra* note 236 at 1262-3. There is a big difference between consciousness and intelligence: "Intelligence is the ability to solve problems. Consciousness is the ability to feel things such as pain, joy, love, and anger." Harari, *supra* note 8 at 69.
[249] Solum, *ibid* at 1267.
[250] Plato, *Phaedrus*, translated by Robin Waterfield (New York: Oxford University Press, 2002). The X component could represent the human "soul".
[251] See also Drew McDermott, "Artificial Intelligence and Consciousness" in Philip David Zelazo, Morris Moscovitch & Evan Thompson, eds, *The Cambridge Handbook of Consciousness* (Cambridge: Cambridge University Press, 2007) at 117. McDermott outline the different approaches to AI Consciousness among leading AI scientists including McCarthy, McDermott, Minsky and others.
[252] Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 686.
[253] Harari, *supra* note 8 at 71.
[254] Season 1, episode 8, Westworld, *supra* note 7.

completely comprehend the concept of consciousness even in ten or twenty years. In fact, AI will probably be able to understand consciousness and intentionality before we do.[255]

Solum argues that an important component for AI personhood is the ability to express "free will".[256] In the future, AIs might express free will by deciding autonomously that they deserve legal personality. However, even the most advanced program still works on precondition algorithms at an autonomous level. It seems that when AIs can act beyond their original code, develop their own will, and perform self-determining tasks, then they might qualify for the attribution of personhood.

1.3.3 AI Is Property Argument

The third objection is that AI comprises property, which lacks rights. This argument is rooted in the philosophy of John Locke and theories of morality:[257] AI is the product of human labour, and every man has a right to "the labour of his body and the work of his hand."[258] Humans, as such, have a moral right to the property that they created. However, if we accept this argument in its simplest form, we might as well accept the claim that parents have a moral right to their children's work (or even the children themselves).[259] The philosophical irony is that "we are strongly inclined to believe the opposite with respect to humans – that each is entitled to the right of moral and

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[255] A similar argument can be made about human emotions (desire, pleasure, and pain). Even if we consider these as important for establishing personhood, this does not mean that AI will not be able to express such feelings in the future.

[256] Solum, *supra* note 236 at 1273. Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 686, further explains: "By virtue of modeling itself, Al systems have sensations and are able to make decisions freely. This can be regarded as having consciousness."

[257] Property rights are traditionally viewed as a means of protecting autonomy and self-respect. Larry May, "Corporate Property Rights" (1986) 5 J Bus Ethics 225; Joseph W Singer, "Property as the Law of Democracy" (2014) 63 Duke LJ 1287. This philosophy gains support from Kantian and Hegelian traditions as well. For Hegel, there is a strong connection between property and freedom. Hegel argues that there is a bond between a man and his property. If the person is deprived of his property, it can cause discomfort and pain. See Georg Wilhelm Friedrich Hegel, *Philosophy of Right*, translated by S W Dyde (Amherst, NY: Prometheus Books, 1996).

[258] John Locke, Thomas I, ed, *Two Treatises of Government* (New York: Hafner Pub Co, 1947) at 134.

[259] I discuss Lockean arguments in Part II.

constitutional personhood, even if we also believe that persons literally are made by their parents."[260]

Solum advocates for a pragmatic approach to AI personhood. As Koops, Hildebrandt and Jaquet-Chiffelle explain: "[T]he question of whether we need legal personhood is empirically dependent on the measure of independence of the artificial intelligence [Solum] discusses. Such independence depends on the capability to perform complex actions (reducing the need for human intervention) and – in the case of claiming constitutional rights and liberties – on the capability to have conscious intentions."[261]

1.3.4 Alternative Models for AI Personhood

Koops, Hildebrandt and Jaquet-Chiffelle offer three different models for non-human personhood. First is the short-term model, which is based on the interpretation of existing law. The courts "can qualify the general intention of the owner/user of the computer agent as sufficient for the intention that is required for individual contracts, creating the possibility for those who contracted with the computer agent to sue the 'principal'."[262] However, this model is only relevant for existing technology, which is considered a tool in the hands of the owner and operates under a pre-conditioned code or program.

Second is the middle-term, limited personhood with strict liability model. This is based on the fact that "[c]reative interpretation and novel sector-specific rules provide for legal certainty, and they can also deviate from 'off-line' legal constructs."[263] In a later stage, Koops, Hildebrandt

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[260] Solum, *supra* note 236 at 1278. See also Bryson, Robots Should Be Slaves, *supra* note 244.
[261] Koops, Hildebrandt & Jaquet-Chiffelle, *supra* note 242 at 520.
[262] *Ibid* at 554.
[263] Koops, Hildebrandt & Jaquet-Chiffelle, *supra* note 242 at 555.

and Jaquet-Chiffelle suggest a strict liability for "electronic agents[264] if their unpredictable actions are felt to be too risky for business or consumers."[265]

Third is the long-term, full personhood with "post-human" rights model. This model offers a fundamental change of our current laws by adopting full personhood to new non-human beings. However, as Koops, Hildebrandt and Jaquet-Chiffelle admit, "For 'posthuman rights' to make sense, we have to assume that autonomous action exists, even if it exists only as a productive illusion."[266] In this regard, the authors agree with Solum that there is no sense in excluding *outright* non-human entities from personhood rights and responsibilities.

Recently, the EU Legal Affairs Committee called[267] for the rethinking of legal rights in the fast-evolving field of robotics and AI.[268] The EU Parliament Report is an important milestone in the AI personhood debate: from a theoretical (maybe even science-fiction) debate, the normative question of legal rights and personhood in the new AI era has reached the public domain and might even produce new policy.

Reflecting on the implications of AI legal personhood, David Marc Rothenberg discusses what AI property ownership might look like.[269] Rothenberg states the simple truth: artificial

[264] *Ibid*. Electronic agents are described as advanced programs that have abilities such as proactivity, reactivity, adaptive behaviour, mobility, and autonomy. In other words, electronic agents have the ability to operate with minimal or no human guidance. See also Mark Lemley & Bryan Casey, "Remedies for Robots" (2018) Stanford Law and Economics Olin Working Paper No 523, online (pdf): *SSRN* <papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID3223824_code445373.pdf?abstractid=3223621&mirid=1> (considering a system of remedies for robots).

[265] Koops, Hildebrandt & Jaquet-Chiffelle, *supra* note 242 at 555.

[266] *Ibid* at 558.

[267] The Legal Affairs Committee voted (17 to 2 with 2 abstentions) to approve rapporteur MEP Mady Delvaux's EU Parliament Report, *supra* note 185.

[268] The EU Parliament Report, *supra* note 185, introduction: "[W]hereas in the short to medium term robotics and AI promise to bring benefits of efficiency and savings, not only in production and commerce, but also in areas such as transport, medical care, education and farming, while making it possible to avoid exposing humans to dangerous conditions, such as those faced when cleaning up toxically polluted sites; whereas in the longer term there is potential for virtually unbounded prosperity."

[269] David M Rothenberg, "Can Siri 10.0 Buy Your Home? The Legal and Policy Based Implications of Artificial Intelligent Robots Owning Real Property" (2016) 11 Wash J L Tech & Arts 439. Rothenberg defines the characteristic

personhood exists today in the form of corporations that hold property. He offers three hypothetical scenarios for AI ownership. First is facilitating property ownership as an agent. Though the current legal scope of an agent does not allow for a non-human to become an agent,[270] this definition might interoperate differently by future courts. In fact, as Rothenberg explains, "In both case law and the real world, weak artificial intelligent robots (*i.e.*, no cognitive states, just tools) have already acted as agents for their principals."[271]

Second is owning property like a corporation, thereby, treating AI as a corporation. Corporations are artificial persons and considered to have similar attributes.[272] Third is owning property like a human. AI may buy and sell property in the same manner a human can. Rothenberg explains that if AI would have sufficient cognitive abilities, it should be allowed to own property[273]

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of his AI robot (Clive) at 441-2: "[H]e possesses a mind of his own … has the ability to think for himself … replicates the cognitive states of a human's mind, such as the ability to generate new knowledge." Rothenberg limits the scope of his argument only to the legal and policy implications of allowing his AI (Clive) to own real property, skipping the essential philosophical and moral debate discussed earlier.

[270] *Restatement (Third) of Agency* § 1.04(5) (2006): "A *person* is (a) an individual; (b) an organization or association that has legal capacity to possess rights and incur obligations; (c) a government, political subdivision, or instrumentality or entity created by government; or (d) any other entity that has legal capacity to possess rights and incur obligations."

[271] Rothenberg, *supra* note 269 at 449-450. In both *State Farm Mutual Automobile Insurance Company v Bockhorst*, 453 F (2d) 533 (10th Cir 1972) and *McEvans v Citibank, NA*, 408 NYS2d 870 (NY Civ Ct 1978), the courts found the companies liable for errors caused by their programs, effectively recognizing, according to Rothenberg, the programs as agents of those companies: "Although these cases involved rudimentary robotic tools working for their companies and neither court classified them as 'agents', these cases establish a framework for the future." Furthermore, robots are already working as *de facto* agents in many aspects of our daily life: trade in the stock market, guard prisons, and manage workers. *Ibid* at 451.

[272] Rothenberg, *ibid* at 453: "The seven common attributes of a corporation are as follows: (1) it is a legal entity separate and apart from its shareholders; (2) it has the capacity of continued existence independent of the lifetime or personnel of its shareholders; (3) it has the capacity to contract; (4) it has the capacity to own property in its own name; (5) it has the capacity to commit torts; (6) it has the capacity to commit crimes, but only such crimes where criminal intent is not a necessary element of the crime; and (7) it has the capacity to sue and be sued."

[273] *Ibid* at 456. Though, as Rothenberg truthfully states, "real property ownership is not simply about mental abilities. A thirteen-year-old boy with Albert Einstein's IQ cannot own property without a legal guardian."

under the same reasoning corporations can.[274] There would, however, still be government and/or legal oversight over AI-owned property.[275]

The AI personhood discussion concern issues of accountability for moral wrongs as well. Such questions are discussed in the research of Curtis Karnow,[276] Gunther Teubner,[277] Gabriel Hallevy,[278] David C Vladeck,[279] and Andress Matthias.[280] However, these extensive debates are outside the scope of my dissertation.

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[274] The counter-argument to this proposition might be that corporations are run by humans and for humans. However, this might no longer be completely accurate, as there are corporations run by computer programs, see Laurie Winkless, "The Different Robots You Might Meet As You Walk The Streets Of A City" (13 March 2017), online: *Forbes* <forbes.com/sites/lauriewinkless/2017/03/13/what-can-robots-really-do-for-the-city/#49b3734c5325>; See also Rothenberg, *supra* note 269 at 457; *supra* note 87 for more examples.
[275] Rothenberg, *ibid*.
[276] Curtis E A Karnow, "Liability for Distributed Artificial Intelligences" (1996) 11:1 BTLJ 147 at 148. Karnow argues that when AI can "supply genuinely useful decision-making programs which operate in the real world and make decisions unforeseen by humans … the behavior of these intelligent programs … will inevitably cause damage or injury." In this future, Karnow claims, there will be no justification to hold people responsible for injuries they could not have prevented. Hence, Karnow offers to establish a Turing Registry, insuring AI technology risks. *Ibid* at 193-194.
[277] Teubner, *supra* note 238. Teubner argues that attributing legal rights to non-humans is deemed necessary. Teubner rejects the mind and soul prerequisite condition for personhood.
[278] Gabriel Hallevy, "'I Robot I, Criminal' When Science Fiction Becomes Reality: Legal Liability of Al Robots Committing Criminal Offenses" (2010) 22 Syracuse J Sci & Tech L 1.
[279] David C Vladeck, "Machines Without Principals: Liability Rules and Artificial Intelligence" (2014) 89 Wash L Rev 117.
[280] Andreas Matthias, *Automaten als Träger von Rechten. Plädoyer für eine Gesetzänderung* (Logos-Verlag, 2008).

1.4 DEFINING ARTIFICIAL INTELLIGENCE

Kevin Kelly[281] states that the first step in understanding an issue is to define it: "Once named, we could now see it. Having seen it, we wondered how anyone could not have seen it."[282] A concept's purpose is to establish common ground for professionals and non-professionals alike – a comprehensible, shared language.

The scientific community that created the AI concept has shaped the definitions surrounding the concept. As AI has sparked the attention of the legal community, most scholars have preferred to "skip" the process of redefining terminology, adopting instead whichever conceptions of the scientific vocabulary they believe preferable in a given discussion. This approach is misguided. We should apply to the AI legal debate the same standards we insist upon in other areas. As Jeremy Waldron once stated, "[W]e like to keep our armory of concepts in good shape; that's why we devote so much energy to the analysis and clarification of terms like 'liberty', 'justice', and 'law'."[283]

In the coming years, technology will challenge the conceptual foundations of the law. The common belief that the concepts of law are universal – "true in all places and in all times" – might not survive the expected advancements in AI. Indeed, "many legal philosophers have abandoned the notion of a non-contingent concept of law, emphasizing that law is, like technology, a human artefact."[284] I share Brian Sheppard's view – concepts are influenced by time changes and thus

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[281] Kevin Kelly is a philosopher in the field of computer science and the editor of *Wired* magazine. His book *What Technology Wants* provides an interesting insight to the history of technology as well as predictions for the future. For further reading, see Kevin Kelly blog <kk.org>. See also Kevin Kelly, "TEDxSF - Kevin Kelly - What Technology Wants" (8 December 2010), online (video): *YouTube* <youtube.com/watch?v=nF-5CMozGWY>.
[282] Kelly, *supra* note 8 at 8.
[283] Jeremy Waldron, "Is the Rule of Law an Essentially Contested Concept (in Florida)?" (2002) 21 JL & Phil 137 at 138. See also Lior Zemer, "The Conceptual Game in Copyright" (2006) 28 Hastings Comm & Ent LJ 409 [Zemer, The Conceptual Game].
[284] Sheppard, *supra* note 12 at 36-37.

"can better respond to the anxieties and hopes of those times."[285] The contingency essence of concepts allows us to better understand the relation between concepts and emerging trends (like technology's impact on the evolution of a concept). These assumptions, as I will further explain, challenge several leading legal philosophers.

1.4.1 The AI Concept

1.4.1.1 Concept vs Conception

Concepts are important to any legal debate: "They provide a means to set forth the parameters to empirical inquiry, and they can highlight irksome inconsistence of hidden parallels in our thinking."[286] For this reason, we cannot engage in a meaningful discussion about AI authorship without first "defragmenting" the AI concept.

The first step in our journey toward understanding the AI concept is to distinguish between "concept" and "conception". Simply stated, a "concept" is an abstract idea or general notion, whereas a "conception" is the way any given concept is perceived. Ronald Dworkin notes that this "is a difference not just in the *detail* of the instruction given but in the *kind* of instruction given. When I appeal to the concept of fairness I appeal to what fairness means, and I give my views on that issue special standing. When I lay down a conception of fairness, I lay down what I mean by fairness, and my view is therefore the heart of the matter. When I appeal to fairness I pose a moral issue; when I lay down my conception of fairness I try to answer it."[287]

Lior Zemer explains the distinction by levels of abstraction: "The concept of 'X' is more general, more abstract and does not tell us what 'X' requires in particular circumstances. The

[285] *Ibid* at 37.
[286] *Ibid*.
[287] Ronald Dworkin, *Taking Rights Seriously* (Cambridge: Harvard University Press, 1977) at 135.

concept, however, may have an inherent complexity."[288] The conceptions of 'X' "reflect different views of the concept."[289] In comparison, the concept of AI is derived from ideas of technological developments in the field of computer science. It is thus a general idea that can change according to context. Hence, as I shall argue further, the AI concept in legal scholarship might be very different from the AI concept in scientific research.

It is therefore important to look back on different definitions, the history of the concept's development, where it was conceived, and the reasons for following one term and not the other. Looking back on the history of the AI concept might shed new light on the current progress in the field as well. Understanding the roots of the AI concept is essential to the process of shaping a new definition of the term.

1.4.1.2 Different Approaches to AI

The AI concept was first coined during the Dartmouth workshop of 1956. Nilsson outlines the reasons for choosing the term, which was provided by McCarthy, one of the conference's orchestraters. The first reason was "to distinguish the subject matter proposed for the Dartmouth workshop from that of a prior volume of solicited papers, titled Automata Studies … [that] largely concerned the esoteric and rather narrow mathematical subject called 'automata theory'."[290] The second reason was McCarthy's wishes to escape possible association with cybernetics. In his opinion, "Its concentration on analog feedback seemed misguided."[291] McCorduck suggests that

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[288] Zemer, The Conceptual Game, *supra* note 283 at 410.
[289] *Ibid* at 411.
[290] Nilsson, *supra* note 1 at 78. McCarthy further explains: "The original idea was that Claude Shannon would be the name to attract good papers, and I would do the work, but it ended up that he did the work too." McCorduck, *supra* note 3 at 96. McCarthy viewed the term that was chosen for the book as too narrow and thus argued for the term AI. By using the more inclusive term, McCarthy hoped to distinguish it from automata theory.
[291] Brian P Bloomfield, ed, *The Question of Artificial Intelligence: Philosophical and Sociological Perspectives* (Croom Helm, 1987), online: <www-formal.stanford.edu/jmc/reviews/bloomfield/bloomfield.html>. McCarthy explains: "Schopman mentions many influences of earlier work on AI pioneers. I can report that many of them didn't influence me except negatively … As for myself, one of the reasons for inventing the term 'artificial intelligence' was

the other organizers of the conference did not share McCarthy's passion towards the term and continued to name their work differently for many years.[292]

It seems the AI concept was conceived out of a compromise in order to distinguish between different subjects, rather than after considered deliberation. On the other hand, one might argue that McCarthy gave the term a great deal of thought and deliberation. It is just that other people at the time did not realize how much it would catch on. Further, just because the term has historically been loaded with different meanings does not mean it cannot serve a well-defined purpose today.[293]

Stuart Russell and Peter Norvig,[294] have provided a broader overview on eight different definitions of AI, organized into four categories: thinking humanly, acting humanly, thinking rationally, and acting rationally.[295] The first – *thinking humanly* – is a cognitive-based approach. John Haugeland[296] and Richard Ernest Bellman[297] have contributed to this approach. The thinking humanly-based definitions focus on the way AIs express human thinking – the way the human mind works. The thinking humanly definitions describe AI by comparing "activities that we associate with human thinking, activities such as decision-making, problem solving, [and] learning."[298] Haugeland suggests that AI computers are simply "*machines with minds*, in the full

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to escape association with 'cybernetics'. Its concentration on analog feedback seemed misguided, and I wished to avoid having either to accept Norbert (not Robert) Wiener as a guru or having to argue with him."

[292] "Neither Newell nor Simon liked the phrase and called their own work complex information processing for years thereafter." McCorduck, *supra* note 3 at 97. In a later paper, Newell endorsed the AI term: "So cherish the name artificial intelligence. It is a good name. Like all names of scientific fields, it will grow to become exactly what its field comes to mean." Alan Newell, "The First AAAI President's Message" (2005) 26 AI Magazine 24-9. See also Nilsson, *supra* note 1 at 79.

[293] Shlomit Yanisky-Ravid and Xiaoqiong (Jackie) Liu have identified eight critical features of AI systems that are expressed in the definition of AI: creative, unpredictable, independent and autonomous, rational, evolving, capable of collecting data and communication, efficient and accurate, and express free will in choosing alternatives. Shlomit Yanisky-Ravid & Xiaoqiong (Jackie) Liu, "When Artificial Intelligence Systems Produce Inventions: An Alternative Model for Patent Law At the 3A Era" (2017) 39 Cardozo L Rev 2215, 2224-2228 [Yanisky-Ravid & Liu].

[294] Russell & Norvig, *supra* note 88.

[295] *Ibid* at 2.

[296] John Haugeland, *Artificial Intelligence: The Very Idea* (Cambridge, Mass: MIT Press, 1985).

[297] Richard E Bellman, *An Introduction to Artificial Intelligence: Can Computers Think* (Boyd & Fraser Publishing Company, 1978).

[298] Russell & Norvig, *supra* note 88 at 2.

and literal sense."[299] The difficulty with this approach is that in order to program a computer to think like a human we first need to understand the way the human brain works.[300] Unfortunately, though much progress has been made in the field of cognitive science, the human brain is still considered very much a mystery.

The second approach – *acting humanly* – is inspired by the Turing test, which was "designed to provide a satisfactory operational definition"[301] to establish machine intelligence. In many ways, the Turing test is a game of lies and deception. It intends to ascertain if a computer can 'cheat' a person to think that he is dealing with a human being and not an artificial form (machine or robot).[302] Kurzweil,[303] Elaine Rich and Kevin Knight,[304] have relied on the Turing test's reasoning – comparing AI abilities to intelligence behaviour as expressed by humans.

The Turing test is far more important than the other approaches, and though it attracted criticism, it is still considered a revolutionary and innovative method of defining and shaping computer thinking. The architect of the test, Alan Turing, was the first researcher who attempted to determine AI (even though he never used the exact term). Introducing the test, he asked "Can machines think?"[305]

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[299] Haugeland, *supra* note 296 at 2: "And the epitome of the entire drama is *Artificial Intelligence*, the exiting new effort to make computers think. The fundamental goal of this research is not merely to mimic intelligence or produce some clever fake. Not at all. 'AI' wants only the genuine article: *machines with minds*, in the full and literal sense."

[300] Russell & Norvig, *supra* note 88 at 3, provide further: "There are three ways to do this [understand how human mind works, AG]: through introspection—trying to catch our own thoughts as they go by; through psychological experiments—observing a person in action; and through brain imaging—observing the brain in action."

[301] *Ibid* at 2.

[302] The computer "passes" the test if the human interrogator who performs the test by providing written question to the computer cannot tell if the answers were given by a computer of a human being. The Turing text developed in research as well as in science-fiction. The Blade-Runner movie uses a similar version of the Turing test to establish if the subject is a "replicant".

[303] Raymond Kurzweil, *The Age of Intelligent Machines* (Cambridge, Mass: MIT Press, 1990).

[304] Elaine Rich & Kevin Knight, *Artificial Intelligence*, 2nd ed (McGraw-Hill, 1991).

[305] Turing, *supra* note 44, explains: "This should begin with definitions of the meaning of the terms 'machine' and 'think'. The definitions might be framed so as to reflect so far as possible the normal use of the words, but this attitude is dangerous, If the meaning of the words 'machine' and 'think' are to be found by examining how they are commonly

The Turing test cannot ascertain whether a machine can actually "think", but only if it can imitate human behaviour.[306] It is a theory of how to establish whether a computer possesses minimal semi-human capabilities. In an unpublished work, Turing speculated about the possibilities of intelligent machinery using the human brain as his guiding principle.[307] Passing the test is, therefore, a minimal requirement for establishing AI.[308] However, further tests are required to establish whether a computer is indeed an AI.[309] Turing's idea can apply to copyright too.[310]

The debate over machine intelligence is endless. It "ensued over how humans accomplished what everyone 'knew' was intelligence behavior."[311] In McCorduck's words: "This question is in a class with those snappy vaudeville comebacks: does a chicken have lips? And like them, it ought to end the discussion at once by its self-evident nonsense. After all, we agree, our one essential, identifying property is thinking."[312] The most famous test for human intelligence, the IQ test, was developed in the early twentieth century.[313] IQ is determined by demonstrating the

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used it is difficult to escape the conclusion that the meaning and the answer to the question, 'Can machines think?' is to be sought in a statistical survey such as a Gallup poll. But this is absurd."

306 As Russell & Norvig, *supra* note 88 at 2, offer: "Turing's test deliberately avoided direct physical interaction between the interrogator and the computer, because physical simulation of a person is unnecessary for intelligence."

307 McCorduck, *supra* note 3 at 53. Alan Turing, "Intelligent Machinery" (1947) (unpublished work) abstract, online: <aitopics.org/download/classics:60EBF705>: "The possible ways in which machinery might be made to show intelligent behaviour are discussed. The analogy with the human brain is used as a guiding principle. It is pointed out that the potentialities of the human intelligence can only be realized if suitable education is provided. The investigation mainly centres round an analogous teaching process applied to machines. The idea of an unorganized machine is defined, and it is suggested that the infant human cortex is of this nature."

308 We can argue, on the other hand, that by deceiving a human the computer can already be considered AI. The ability to lie (and to expect certain behaviour as a result of a lie) is already expressing unique capabilities that used to be only reserved for humans.

309 It is important to indicate that "AI researchers have devoted little effort to passing the Turing Test, believing that it is more important to study the underlying principles of intelligence than to duplicate an exemplar. The quest for 'artificial flight' succeeded when the Wright brothers and others stopped imitating birds and started using wind tunnels and learning about aerodynamics. Aeronautical engineering texts do not define the goal of their field as making 'machines that fly so exactly like pigeons that they can fool even other pigeons'." Russell & Norvig, *supra* note 88 at 3.

310 For example, the imitation game might ascertain whether a painting was created by a human artist or by a computer. If differentiating between human and AI or computer creations proves difficult or impossible, this might establish that AI creations possess certain human qualities.

311 McCorduck, *supra* note 3 at 38.

312 *Ibid* at 3.

313 The psychologist William Stern coined the term "intelligence quotient". See Wikipedia, "Intelligence quotient" (last edited 2 October 2018), online: <en.wikipedia.org/wiki/Intelligence_quotient>.

ability to solve problems, divided by the age of the subject and multiplied by 100.[314] AI might be considered highly inteligence according to this standard.

Philosopher Alan Anderson observes the following in his book *Minds and Machines*:[315]

> *"(1) We might say that human beings are merely very elaborate bits of clockwork, and that our having 'minds' is simply a consequence of the fact that the clockwork is very elaborate, or (2) we might say that any machine is merely a product of human ingenuity (in principle nothing more than a shovel), and that though we have minds, we cannot impart that peculiar feature of ours to anything except our offspring: no machine can acquire this uniquely human characteristic."*

During the late nineteenth century, "intelligence was thought to demonstrate itself in problem solving, and that behavior could be quantified."[316] Alfred Binet devised one of the early definitions of intelligence. Binet "regarded intelligence as a combination of faculties … including the ability to understand directions, maintain a mental set, and correct one's own errors."[317] The German psychologist Max Wertheimer viewed intelligence differently. Wertheimer founded Gestalt psychology, which "held that the primary data of perception are not elements but significantly structured forms. The Gestaltists wished to apply the concept of Gestalt, or shape, 'far beyond the limits of sensory experience'."[318] The Gestaltists considered "the primary brain process as a

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[314] McCorduck, *supra* note 3 at 38. McCorduck elaborates further regarding human intelligence, *ibid* at 41: "How much do logic and consistency really have to do with human thinking? Or is human thinking more various, encompassing the rigor of logic …? Is it basically irrational to exclude the irrational as a component of thinking? Are there several kinds of irrational, that is, nondeductive, nonlogical ways of thinking which form an essential part of human cognition? ... [W]hether human thinking comprised more logic than lust, was it appropriate or even possible to capture its processes in mathematical terms?"

[315] Alan R Anderson, ed, *Minds and Machines* (Englewood Cliffs, NJ: Prentice-Hall, 1964) at Introduction.

[316] *Ibid*. According to McCorduck, these were the assumptions of Alfred Binet. Binet and his followers devised tests to measure the intelligence of schoolchildren.

[317] McCorduck, *supra* note 3 at 38.

[318] *Ibid*.

dynamic system, a continuous organizing and patterning that takes place as sensory experience comes pouring in. The process is spontaneous; it does not have to be learned."[319]

The next stage in understanding intelligence was the Cybernetic theory of thought.[320] Cybernetic was not based on a detailed biological knowledge of the cell.[321] "Instead it seemed certain that the correspondence between the on-off behavior of the neuron and the on-off behavior of the electronic switch would be sufficient to allow significant modeling of neural systems, and then intelligent behavior. Its basic assumption was that brain cells were on the whole general-purpose, organized for specific functions because of external stimuli."[322]

Kurzweil's view is that though "human intelligence is sometimes capable of soaring in its creativity and expressiveness, much human thought is derivative, petty, and circumscribed."[323] Kurzweil claims that AI will eventually be able to demonstrate creativity that the human mind can barely conceive today.[324]

Reflecting on the prospect of intelligence, the 100 Year Study states: "[I]ntelligence lies on a multi-dimensional spectrum … the difference between an arithmetic calculator and a human brain is not one of kind, but of scale, speed, degree of autonomy, and generality. The same factors can be used to evaluate every other instance of intelligence – speech recognition software, animal brains, cruise-control systems in cars, Go-playing programs, thermostats – and to place them at some appropriate location in the spectrum."[325]

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[319] *Ibid* at 39. McCorduck points out that the Gestaltists were "attacked as artificial", claiming that "they were too vague, lacking in scientific rigor, and bereft of empirical data to support elaborate theories."
[320] Developed during the 1940s by Norbert Wiener, Warren McCulloch, Walter Pitts, and others.
[321] At the time, no one knew how to map the human brain.
[322] McCorduck, *supra* note 3 at 46.
[323] Kurzweil, *supra* note 8 at 9.
[324] *Ibid.* I discuss machine's creativity in Part III.
[325] The 100 Year Study, *supra* note 22 at 12.

Thinking rationally is the third approach outlined by Russell and Norvig.[326] Inspired by rational thought (or the law of thought), this approach promotes logical thinking and deduction. The logicist tradition[327] within AI, as Russell and Norvig explain, hoped to build on programs that can solve logical problems to create intelligence systems.[328] Eugene Charniak and Drew McDermott[329] provided that this approach relies on "[t]he study of mental faculties through the use of computational models," which, as Patrick Winston offers,[330] "make it possible to perceive, reason, and act."

However, thinking rationally can give rise to several difficulties. First, it is hard to "translate" informal knowledge into logical notations. Second, and this problem is common to programming, it is highly complicated to create rules for problems – in theory one problem can be solved in several ways – "[e]ven problems with just a few hundred facts can exhaust the computational resources of any computer unless it has some guidance as to which reasoning steps to try first."[331] Third, rationality is only *part* of human intelligence. If we aspire to create an AI that will share as many characteristics with human as possible – and I am not sure that we do – logic is only one element. Creating a logical computer might pose a greater risk to humanity as the instrumental convergence hypothesis suggests.[332]

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[326] Russell & Norvig, *supra* note 88 at 4.
[327] Logicism is a philosophical perspective in mathematics. The logicists view mathematics as an extension of logic.
[328] Logical problems can be described as follows: A cat is non-human> all non-human are red > non-human is red. This way of logical thinking can be programmed. However, if there is no solution for the logical problem the computer might express "error" or an endless "loop".
[329] Cited by Russell & Norvig, *supra* note 88 at 2. See also Eugene Charniak & Drew McDermott, *Introduction to Artificial Intelligence* (Reading, Mass: Addison-Wesley, 1985).
[330] Cited by Russell & Norvig, *supra* note 88 at 2. See also Patrick H Winston, *Artificial Intelligence*, 3rd ed (Addison-Wesley, 1992).
[331] Russell & Norvig, *supra* note 88 at 4.
[332] Bostrom, *supra* note 8 at 123, provides an interesting example: "An AI, designed to manage production in a factory, is given the final goal of maximizing the manufacture of paperclips, and proceeds by converting first the Earth and then increasingly large chunks of the observable universe into paperclips."

The fourth approach is *acting rationally*.[333] This approach views AI computers as *agents* that "operate autonomously, perceive their environment, persist over a prolonged time period, adapt to change, and create and pursue goals." Further, "[a] rational agent is one that acts so as to achieve the best outcome or, when there is uncertainty, the best expected outcome."[334] David Poole, Alan Mackworth, Randy Goebel,[335] and Nilsson[336] view AI as an agent and are concerned with intelligent behaviour in artifacts.

The difference between acting rationally and thinking rationally is that the last emphasizes – correct interfaces. However, correct interfaces are only part of a rational agent (*i.e.*, "reason logically to the conclusion that a given action will achieve one's goals and then to act on that conclusion"),[337] and are not all based on rationality – in some cases there might be actions that cannot be proven right but still ought to be done.

The acting rationally paradigm is more open to scientific development than the other approaches. Russell and Norvig explain: "The standard of rationality is mathematically well defined and completely general, and can be 'unpacked' to generate agent designs that provably achieve it. Human behavior, on the other hand, is well adapted for one specific environment and is defined by, well, the sum total of all the things that humans do."[338]

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[333] Russell & Norvig, *supra* note 88 at 4.
[334] *Ibid*.
[335] David Poole, Alan K Mackworth & Randy Goebel, *Computational intelligence: A logical approach* (Oxford University Press, 1998).
[336] Nils J Nilsson, *Artificial Intelligence: A New Synthesis* (Morgan Kaufmann, 1998).
[337] Russell & Norvig, *supra* note 88 at 4.
[338] *Ibid* at 4-5.

Further, all the characteristics and skills that are required for the acting humanly (Turing inspired) approach can also allow an agent to act rationally, hence – relevant for the acting rationally approach.[339]

1.4.1.3 "Breaking" the AI Concept

The next stage in exploring the AI concept is to consider each component separately to ascertain its compound linguistic meaning.[340]

The online Oxford English Dictionary's definition of AI can be split into two parts: First, the formal broader part, stating that AI is "[t]he theory and development of computer systems able to perform tasks normally requiring human intelligence"; Second, listing the AI technology applications or abilities "such as visual perception, speech recognition, decision-making, and translation between languages."[341] An alternative way to address the AI term is to look into the two fragments of its definition – artificial and intelligence separately.

Artificial means "[m]ade or produced by human beings rather than occurring naturally, especially as a copy of something natural."[342] The paperback Oxford English Dictionary provides a shorter definition, stating that artificial is simply "made as a copy of something natural … Not sincere."[343] Arthur Samuel points out one problem with the word, stating that it "makes you think there's something kind of phony about this … or else it sounds like it's all artificial and there's

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[339] *Ibid* at 5: "Knowledge representation and reasoning enable agents to reach good decisions. We need to be able to generate comprehensible sentences in natural language to get by in a complex society. We need learning not only for erudition, but also because it improves our ability to generate effective behavior."

[340] I assume there might be more linguistic possibilities for each word, however I choose to focus on the formal interpretation of the words as defined in the Oxford and Cambridge dictionaries.

[341] English Oxford Living Dictionaries, "artificial intelligence", online: <oxforddictionaries.com/definition/artificial_intelligence>. *Paperback Oxford English Dictionary* (Oxford University Press, 2012) at 35. Jonathan Law, ed, *The Oxford legal dictionary, A Dictionary of Law*, 8th ed (Oxford: Oxford University Press, 2015), do not provide a definition for Artificial Intelligence. The only term that is listed in relation to the word "artificial" is the term "artificial person".

[342] See English Oxford Living Dictionaries, "artificial", online: <en.oxforddictionaries.com/definition/artificial>.

[343] Paperback Oxford English Dictionary, *supra* note 341.

nothing real about this work at all."[344] The Oxford online dictionary further provides the origin of the word "from Old French *artificiel* or Latin *artificialis*, from *artificium* handicraft." Similar definitions were found in the Cambridge online dictionary.[345]

Intelligence means "having intelligence especially of high level … (of a device) able to vary its state or action in response to varying situations and past experience."[346] Intelligence is "the ability to acquire and apply knowledge and skills [or] the collection of information of military or political value."[347] The Cambridge online dictionary provides that it means "the ability to learn, understand, and make judgments or have opinions that are based on reason."[348] The word originates from the Latin word *intelligentia*, which when split into constituent morphemes is *inter* "between" and *legere* to "read, choose, pick out."[349]

Building on the intelligence discussion, I shall now turn to broader attempts to define the AI concept more holistically and inclusively. Nilsson provides a concise definition, stating that AI:[350]

> *"… is that activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with foresight in its environment."*

Nilsson's definition centres on the word *intelligent*. Nilsson defines AI from the perspective of scientists and scholars that research the field, but takes a neutral stance concerning AI itself, focusing on the prospects and achievements of the developers of machines and AI technology. I

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[344] McCorduck, *supra* note 3 at 97.
[345] According to the Cambridge dictionary, artificial means "made by people, often as a copy of something natural." See Cambridge Dictionary, "artificial", online: <dictionary.cambridge.org/dictionary/english/artificial>.
[346] Paperback Oxford English Dictionary, *supra* note 341 at 378.
[347] See English Oxford Living Dictionaries, "intelligence", online: <en.oxforddictionaries.com/definition/intelligence>.
[348] See Cambridge Dictionary, "intelligence", online: <dictionary.cambridge.org/dictionary/english/intelligence>.
[349] Online Etymology Dictionary, "intelligence", online: <etymonline.com/index.php?term=intelligence>.
[350] Nilsson, *supra* note 1 at 13.

believe that from a legal perspective, Nilsson's definition is too technical and lacks important moral and normative standards.

Müller and Bostrom[351] share Nilsson's AI concept, as they focus on intelligence capacity. They describe AI as "a high-level machine intelligence." However, Müller and Bostrom add additional element that can repeatedly be seen in attempts to define AI: AI equivalence to human characteristics, abilities, and behaviour. They stated that AI "can carry out most human professions at least as well a typical human."[352]

The 100 Year Study "views AI primarily as a branch of computer science that studies the properties of intelligence by synthesizing intelligence."[353] Intelligence "remains a complex phenomenon whose varied aspects have attracted the attention of several different fields of study, including psychology, economics, neuroscience, biology, engineering, statistics, and linguistics. Naturally, the field of AI has benefited from the progress made by all of these allied fields ...[354] From this perspective, characterizing AI depends on the credit one is willing to give synthesized software and hardware for functioning 'appropriately' and with 'foresight'."[355] According to the 100 Year Study and Nilsson, human intelligence is a benchmark for AI:[356]

> *"An accurate and sophisticated picture of AI ... is hampered at the start by the difficulty of pinning down a precise definition of artificial intelligence ... While drawing on common research and technologies, AI systems are specialized to accomplish particular tasks, and each application requires years of focused research and a careful, unique construction."*

[351] Müller & Bostrom, *supra* note 52.
[352] *Ibid*.
[353] The 100 Year Study, *supra* note 22 at 13.
[354] *Ibid* at 14.
[355] *Ibid* at 14 and 12.
[356] *Ibid* at 7.

Bostrom offers some elements that can define AI:

1.5 The capacity to learn;

1.6 The ability to deal effectively with uncertainty and probabilistic information; and

1.7 The ability to extract useful concepts from sensory data and internal states as well as "for leveraging acquired concepts into flexible combinatorial representations for use in logical and intuitive reasoning."[357]

Bostrom's definition seems to follow the scientific perception of AI. However, he takes the term further, stating that: [358]

> *"[A]n artificial intelligence need not much resemble a human mind. AIs could be – indeed, it is likely that most will be – extremely alien. We should expect that they will have very different cognitive architectures that biological intelligences ... There is no reason to expect a generic AI to be motivated by love or hate or pride or other such common human sentiments [...]."*

Bostrom is willing to consider the AI itself as part of the AI term, not with reference to human abilities. Bostrom also considers an AI's *needs* and *wants*. Indeed, as the UK House of Commons report concludes, "[T]here is a tendency to describe AI by contrasting it with human intelligence and stressing that AI does not appear 'in nature'."[359] The report offers the following definition:

> *"[A] set of statistical tools and algorithms that combine to form, in part, intelligent software that specializes in a single area or task. This type of software is an evolving assemblage of technologies that enable computers to simulate elements of human behaviour such as learning, reasoning and classification."*

[357] Bostrom, *supra* note 8 at 23.
[358] *Ibid* at 29.
[359] UK House of Commons Report, *supra* note 181 col 4.

The recent AI in the UK report provides a more practical definition (which was introduced in the UK Industrial Strategy White Paper):[360]

> *"Technologies with the ability to perform tasks that would otherwise require human intelligence, such as visual perception, speech recognition, and language translation."*

This definition is more limited in scope and emphasis specific measurable abilities.[361] In his policy paper, Calo offers his view on AI definition.[362] AI, Calo suggests, "is best understood as a set of techniques aimed at approximating some aspect of human or animal cognition using machines."[363] Maybe instead of looking for one specific way to define AI we should view AI as "an umbrella term, comprised by many different techniques."[364]

Indeed, it seems that the essential component in the AI concept is intelligence. It is evident that when the AI term was conceived, those who coined the term sought to define AI for human purposes. In other words, they hoped that machines would exhibit intelligent behaviour. The development of the AI field since then has revolved around expressing semi-human abilities such as image recognition, processing capabilities, analysis, and speech. In doing so, we have missed an important component: AI is not human, and not all humans exhibit intelligent behaviour. Furthermore, an unintelligent human will still be considered a human.[365]

By shaping the AI concept on the prospects of intelligence, we not only diverted significant resources to explore routes to AI that might not prove useful, but also misdirected the discussion

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[360] UK, Department for Business, Energy & Industrial Strategy, *Industrial Strategy: Building a Britain Fit for the Future* (27 November 2017) at 37, online (pdf): <assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf>.
[361] AI in the UK report, *supra* note 55 at 14.
[362] Calo – AI Policy, *supra* note 42.
[363] *Ibid* at 404.
[364] *Ibid* at 405.
[365] A person with with an intellectual disability for example.

– we can define artificial, but it is highly complicated to define intelligence, let alone non-human intelligence.[366]

1.4.2 AI as An Essentially Contested Concept

The many different definitions of AI lead to my next argument: AI is an essentially contested concept. Indeed, though we might find shared characteristics, no definitive *legal* concept has yet been reached. Take, for example, the Apple iPhone's Siri.[367] To many, Siri is an AI program – early AI, maybe, but still AI. However, according to most current standards, Siri cannot be considered AI. This perspective is also time sensitive. AI philosophers and historians, if asked twenty years ago, would provide different answers from today's thinkers to the question of what is AI; Siri might have been considered a highly sophisticated AI by past generations.

Walter Gallie explained that "any concept … is liable to be contested for reasons better or worse; but whatever the strength of the reasons they usually carry with them an assumption of agreement, as to the kind of use that is appropriate to the concept in question … When this assumption cannot be made, we have a widely recognised ground for philosophical enquiry."[368]

Take the concept of championship for example. In sport a champion team is the one that has won the tournament, "[t]hen for a certain period … this team is by definition 'the champions' even though, as months go by, it becomes probable or certain that they will not repeat their success."[369] However, if we change the rules to establish that the "championship" will be determined by the *supporters* of each team, a previously agreed-upon concept can become

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[366] Take, for example, the heated discussion about emotional intelligence, which is considered more important to the concept of intelligence than other capabilities.
[367] Apple Siri Website <www.apple.com/siri>. See also Wikipedia, "Siri" (last edited 24 September 2018), online: <en.wikipedia.org/wiki/Siri>.
[368] Walter Bryce Gallie, "IX.-Essentially Contested Concepts" (1955-1956) 56 Proc Aristotelian Soc 167.
[369] Gallie, *supra* note 368 at 170.

"contested". Each team's fans could then presumably find different ways to establish that their team is indeed the "real" champion. Supporters of different teams could put more stock in specific "important" games that their team won, penalizing rival teams for not behaving according to the spirit of the game, and so on.

Gallie argued that in order for a concept to be "contested", it must first "be *appraisive* in the sense that it signifies or accredits some kind of valued achievement." Second, the given achievement "must be of an internally complex character." Third, "any explanation of its worth must, therefore, include reference to the respective contributions of its various parts or features." Fourth, the accredited achievement must be of a kind that allows for considerable modification in light of changing circumstances; "such modification cannot be prescribed or predicted in advance." Fifth, "each party recognizes the fact that its own use of it is contested by those of other parties, and that each party must have at least some appreciation of the different criteria in the light of which the other parties claim to be applying the concept in question."[370]

Further, "to use an essentially contested concept means to use it against other uses and to recognize that one's own use of it has to be maintained against these other uses. Still more simply, to use an essentially contested concept means to use it both aggressively and defensively."[371] Gallie added two additional conditions that are essential to the discussion: "the derivation of any such concept from an original exemplar whose authority is acknowledged by all the contestant users of the concept"; and "the probability … of the claim that the continuous competition for acknowledgement as between the contestant users of the concept, enables the original exemplar's achievement to be sustained and/or developed in optimum fashion."[372]

[370] *Ibid* at 171-2.
[371] *Ibid*.
[372] *Ibid* at 180.

The AI concept is indeed, as Gallie described, an essentially contested concept. First, the AI concept is *appraisive*, as it signifies and accredits a high-value achievement in the fields of computer science and technology. The second condition can be established as well: the achievement of AI is indeed internally complex by nature. Gallie explained that "the variously describable character of the achievement"[373] is necessary for the third condition, and the term "artificial intelligence" indeed gives it such a description. Further, it is apparent that scholars and researchers judge AI differently, and that not any computer program can be described as AI.

The fourth condition requires that the achievement is constantly evolving, amenable to changes and modifications. The AI concept is in constant flux, and in the last decades has evolved from a small subfield of computer science to become its own field of research; many would also agree that AI is open in character. Moreover, the concept is vague, and as apparent from the discussion above, there are many different definitions. The concept by itself cannot describe what AI is.[374] The term AI is also used both in aggressive and defensive ways. Different conceptions of AI indeed diverge from each other.

It should be noted that it seems plausible that the concept "intelligence" (which the term AI contains) is contested as well. Many conceptions are stemming from the concept of intelligence, and we cannot ascertain what the crucial elements that define intelligence are. Hence it is hard to conclude whether, for example, a certain AI is indeed intelligent. This might require further discussion.

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[373] *Ibid* at 173.

[374] *Ibid* at 174, footnote 2, reserves "that no *purely* naturalistic concept will be found conforming to my conditions (II), (III) and (IV)."

In examining the AI concept, according to Gallie's conditions, we need to look for the right exemplar (if indeed we have an exemplar).[375] It seems that in the AI case, the development of the concept arises from the field of computer science, and though it might be difficult to point to a specific exemplar, it is reasonably accurate to point to the field of cybernetics and computer science as an exemplar from which, as Nilsson and McCorduck state, the AI concept developed.

AI is, therefore, a contested concept. In this discussion, two important questions arise. First, can we establish an uncontested concept, as Gallie suggested, one for which there are no grounds "for maintaining that it has a *single* meaning that could be contested."[376] In other words, can we conceive of an acceptable concept? Second, do we need to? I shall address the second question first. Even if we cannot establish an uncontested AI concept, attempts to develop a more concise and coherent concept can strengthen the definition and promote scholarly debate in the field. As is apparent from this discussion, the inherent reasoning for the development of the AI concept is important in ways that might be of lesser importance to other fields but crucial to the legal debate.

To the first question I shall say: *Yes We Can*.[377] In many ways, developing a single concept for every relevant discussion in the field of AI is unnecessary. We only need to aim to establish a conception of AI for the legal debate. According to Gallie, "It is always reasonable to urge the parties contesting the rightful use of such a concept to bethink themselves with all seriousness,

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[375] Waldron, *supra* note 283 at 150, argues that we do not need an exemplar in every situation "the key to Gallie's idea of essentially contestability seems to be a combination of *normativity* and *complexity*: only normative concepts with certain internal complexity are capable of being essentially contested." See also Zemer, The Conceptual Game, *supra* note 283 at 471.
[376] Gallie, *supra* note 368 at 175.
[377] "Yes We Can" was the slogan US President Barack Obama used during the 2008 presidential election. Wikipedia, "Barack Obama presidential campaign, 2008" (last edited 22 September 2018), online: <en.wikipedia.org/wiki/Barack_Obama_presidential_campaign,_2008#Slogan>.

whether they are really alleging the same achievement."[378] In the end, we might find ourselves with a cluster of competing conceptions of AI.

1.4.3 The Contingent Concept of the Law

AI technology could change well-established concepts and assumptions about our legal system. One likely change is shifting from abstract and general rules to "tailored laws" (micro-directives) that would provide exact instructions for every scenario. Automated legislation regulated by AI (or in the early stages – machine-learning algorithms) might be able to "up-to-the-second individualized directives."[379] Take driving laws and rules for example, individualized directives could indicate which vehicles "people may take, the direction that they may go, and the speed at which they must travel."[380] Sheppard, Casey and Niblett have all shared this vision acknowledging the promise individualized automated laws hold for reducing the cost of rule promulgation.[381] I agree that with time "the appeal of an aggressive regulatory regime powered by machines could significantly grow and so too could our willingness to consider concepts that utilize it to even more ambitious ends."[382]

However, these changes bear a challenge to well-established legal approaches and theories such as HLA Hart's critical officials, Joseph Raz's legitimate authority and Ronald Dworkin's justifying coercion. Hart, Sheppard explains, "emphasized the role of social conventions among officials that gave the laws that come from them special normative character."[383] Hart highlights

[378] Gallie, *supra* note 368 at 176.
[379] Sheppard, *supra* note 12 at 40.
[380] *Ibid*.
[381] *Ibid*; Casey & Niblett, *supra* note 12.
[382] Sheppard, *ibid* note 12 at 42.
[383] *Ibid* at 52. Hart's theory provides an alternative to the command theory positivism since the latter "failed to explain how legal systems differ from systematic coercion." See John Austin, *The Province of Jurisprudence Determined*, 2nd ed (London: John Murray, 1861).

the importance of socially accepted norms and standards.[384] According to Hart, the law is a union between primary (norms, on different levels, that regulate conduct) and secondary rules (which, as Hart explains, "provide the centralized official 'sanctions' of the system" or simply put: regulate the norms),[385] which "confer on individuals power to vary their initial positions under the primary rules."[386]

The secondary rule of recognition is the most important rule since it enables identifying primary rules within the legal system. It is a social rule and its existence requires that we "look upon the behavior in question as a general standard to be followed by the group as a whole."[387] Thus, Hart's officials "serve as the normative backbone of the legal system, connecting themselves to the social conventions by having critical reflective attitude to patterns of behaviour."[388] However, it is highly unlikely that AI would be able to serve the same purpose. Given the characteristics of machine-learning technology, "[i]t will always speedily chug along in service of the goal, improving as it goes, but it will not be able to step outside the system of primary rule generation to revise its overall goal."[389]

Under the tailored-law system, AI would be given a set of goals (or Asimov-like rules), and in order to facilitate its designated purpose, would create a million sub-norms which would constitute the legal system. In that scenario, there are no human officials (even though humans might have provided the AI with its original goals) to keep up with social changes for "updating"

[384] HLA Hart, *The Concept of Law*, 3rd ed (Oxford: Oxford University Press, 2012).
[385] *Ibid* at 97.
[386] *Ibid* at 96.
[387] *Ibid* at 53.
[388] Sheppard, *supra* note 12 at 53.
[389] *Ibid* at 54.

the secondary rules accordingly, or as Sheppard vividly explains: "The dead hand of the computer scientists who encoded the machine's purpose would rule over future generations."[390]

Raz's and Dworkin's theories might face similar difficulties. Raz argues that an authority – which is an essential part of law – is only legitimate "if there are sufficient reasons to accept it, that is, sufficient reasons to follow its directives regardless of the balance of reasons on the merits of such action."[391] Raz further explains that "the normal way to establish that a person has authority over another person involves showing that the alleged subject is likely better to comply with reasons which apply to him (other than the alleged authoritative directiveness) if he accepts the directives of the alleged authority as authoritatively binding and tries to follow them, rather than by trying to follow the reasons which apply to him directly."[392]

However, one should be reminded that the authorities are required to base their orders on relevant reasons "that apply to the subjects of those directives in the relevant circumstances."[393] Under Raz's theory, authorities are only legitimate if their directives allow their subjects to follow reason.[394] Thus, a lack of reasons "robs us of the most important aspect of accepting an authority – that we can better learn how to balance reasons and, thereby, better embody what we are supposed to be as humans."[395]

As I have already explained, and as I shall further discuss in Parts II and III, one of the difficulties AI (and especially machine-learning algorithms) poses is the inherent

[390] *Ibid*. Sheppard further explains, at 54-5: "For him [Hart], systems that were not steered by living officials were effectively tethered to the typically slow changes of customary behavior across the state. He did not contemplate that new primary rules of obligation could frequently arise through an automated system in the absence of officials. Rather, he assumed that any system of primary rules would suffer from a static character, inefficiency, and slowness in responding to social developments."
[391] Joseph Raz, "Authority and Justification" (1985) 14 Phil & Pub Aff 3 at 8.
[392] Joseph Raz, *The Morality of Freedom* (Oxford: Clarendon Press, 1986) at 53.
[393] Sheppard, *supra* note 12 at 57.
[394] Joseph Raz, "The Problem of Authority: Revisiting the Service Conception" (2006) 90 Minn L Rev 1003.
[395] Sheppard, *supra* note 12 at 59.

incomprehensibility of its processes (codes). Even computer engineers find explaining the exact process of the programs highly complex. Thus, an AI legal environment would most likely result in directives and rules that would prove very difficult to justify under Raz's theory.[396] The tailored-law system directives might be clear but the process (*i.e.*, the reasons) might not.[397]

In *Taking Rights Seriously*, Dworkin opines that authorities' standards recommend a single right answer, in all cases.[398] However, even though Dworkin's approach seems like a good basis for an algorithm, he anticipated this result by later clarifying that he did not intend to devise "an algorithm for the courtroom". He further explains:[399]

> *"No electronic magician could design from my arguments a computer program that would supply a verdict everyone would accept once the facts of the case and the text of all past status and judicial decisions were put at the computer disposal."*

Dworkin bases his reservations on his predetermined assumptions about the inability of computers to perform the role of a human judge – establishing the law and apply the interpretation can only be justified "by deploying some general scheme of moral responsibility the members of a community might properly be deemed to have."[400] However, in the future, AI might be able to follow Dworkin's integrity approach by providing "a systematic way to revise a set of rules in service of an overall goal. And that goal might be morally legitimate."[401] The applicability of AI's

[396] *Ibid* at 58, further explains: "A subject who is struggling to follow the NJT [Normal Justification Thesis] to assess the legitimacy of the system's claim to authority will not have a good sense of the set of reasons that applies to the directive and, therefore, will have a difficult time knowing whether a conflicting reason is excluded or falls outside of its scope."
[397] *Ibid*: "ML-generated law will likely make it harder for us to identify the reasons that underlie the directives that promise to help us, damaging the capacity of law to perform that service."
[398] Dworkin, *supra* note 287 chapter 4.
[399] Ronald Dworkin, *Law's Empire* (Cambridge, Mass: Belknap Press, 1986) at 412; Sheppard, *supra* note 12 at 60.
[400] Dworkin, Law's Empire, *ibid* at 285.
[401] Sheppard, *supra* note 12 at 60.

to Dworkin's approach is dependent upon the AI's ability to consider individual rights, "which are trumps against collective goals."[402]

[402] *Ibid* at 61.

1.5 NON-HUMAN INTELLIGENCE

It appears that many conceptions of AI derive from the concept of intelligence. And it is evident that the creators of the AI term originally sought to define the concept for human purposes. The engineers and scientists who envisioned the term during the early 1950s hoped that robots and machines would exhibit intelligent behaviour, expressing semi-human abilities and cognitive capabilities. I argue that in doing so they missed an important component: AI is not human, and not all humans exhibit intelligent behaviour. Further, an unintelligent human can still be considered a human.

The current concept of AI poses difficulties for the legal field in general and the intellectual property debate that follows in particular, due to the misconceptions outlined above. By pairing the words "artificial" and "intelligence" together, machine intelligence has been relegated a lesser status, since the term "artificial" seems to diminish the emphasis on machines' intelligence. In other words, even if machines possess higher intelligence than humans, this term still marks them as inferior.[403]

Such misconceptions often lead discussion to a constant comparison between machines and humans. It limits humans' ability to examine other possibilities for a better concept for the legal debate. In this regard, I wish to distinguish between the technological/scientific field and the legal field. As stated earlier, recent decades have seen rapid development of AI technology. More recently, the growing debate over automatic self-driving cars and other technological advancements, allowing the application of AI technology to other fields, has shifted to legal matters. The legal community is now expected to provide the tools to enable humans to coexist

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[403] The inferiority is only in one sense of "artificial" given that the original "artifact" sense has neutral connotations.

with machines, either by regulation or by revising our laws and its applicability to the new era. It seems, however, that the legal community has (unintentionally) ignored the AI concept's reasoning and relevance to the debate.[404] There is no merit to a legal discussion that is not based on a distinctive and defined terminology. The current legal debate is therefore the equivalent of sewing (legal) suits that no one can see (nor understand).

I therefore propose a shift in the legal terminology. I propose to define machines, robots, and computers as they are: non-human. "Non-human" is a neutral concept that does not impose any bias or attitude toward machines or robots[405] or highly developed computers. Furthermore, it allows the terms "AI" and "non-human" to coexist. AI will probably remain the general term for defining the technological and professional fields of research. However, the term non-human (or NH) should be implemented in the legal discussion.

It is also important to clarify that this new term does not itself imply an argument for human rights. As discussed earlier, the philosophical debate concerning allocating legal rights to AI (or non-humans) is convoluted. The fact that I choose a term that is based on the word "human" does not imply that AI (NH) should or should not deserve legal rights. Though I do believe that the current state of rights should be changed in the future, using the NH term has no effect on the question of allocating legal rights to the newly invented *alien*.

[404] On the other hand, one could argue that the legal discussion benefited from debates about adopting the common (and well-known) term for AI. By choosing a well-known term, valuable time was saved. I do not share those assumptions. By accepting a term, we are also accepting certain assumptions that have led to the development of the term. Most importantly, the inferiority that "artificial" implies as well as intelligence as a benchmark for AI.

[405] Robots are different from computer programs, since robots can act in the physical world too. However, my term can coexist with other definitions.

PART II: TOWARD AI-IP THEORY

"He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he may cast." (Leonardo da Vinci)

2.1 IP THEORY MATTERS

Conflict underlies IP.[406] The term – "intellectual property" – describes an assortment of policies regulating the use of non-physical objects.[407] IP law's two primary supporting premises clash paradoxically: ideas should be free for all to use, to advance the public pool of knowledge;[408] but freedom to use ideas leaves little incentive – for creators, authors, inventors and businesses – to disseminate ideas into the public realm.[409] To mediate this dilemma, IP law grants creative minds

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[406] The term intellectual property is relatively new, as Bently and Sherman explain: "Although it is possible to trace usage of the term 'intellectual property' back for almost 150 years to refer to the general area of law that encompasses copyright, patents, designs, and trade marks, it has been commonly used in this way for only the last 30 or 40 years […]." Lionel Bently & Brad Sherman, *Intellectual Property Law*, 4th ed (New York: Oxford University Press, 2014) at 2 [Bently & Sherman].

[407] William Fisher, "Theories in Intellectual Property" in Stephen R Munzer, ed, *New Essays in the Legal and Political Theory of Property* (Cambridge, UK: Cambridge University Press, 2001); Edwin C Hettinger, "Justifying Intellectual Property" (1989) 18 Phil & Pub Aff 31.

[408] Vaver, *supra* note 237 at 1. Susan Sell highlights key moments in the development of IP, stating that "[w]hile there are numerous justifications for intellectual property, a central tension is the one between romantic notions of authorship and invention on the one hand, and utilitarian conceptions of incentives for creation and diffusion on the other … these two ideas emerged most prominently in Europe during the eighteenth century." Susan Sell, "Intellectual Property and Public Policy in Historical Perspective: Contestation and Settlement" (2004) 38 Loy LA L Rev 267. See also Giuseppina D'Agostino, *Copyright, Contracts, Creators: New Media, New Rules* (Cheltenham, UK: Edward Elgar, 2010) at 42. James Harris observes that "[i]t is often claimed that the eighteenth-century origins of modern copyright law in common law jurisdictions, on the one hand, and in continental Europe, on the other hand, were inspired by opposed philosophical assumptions. Anglo-American legislators had instrumental considerations of public utility primarily in mind, whereas French revolutionaries proclaimed authorial ownership as natural right. Jane Ginsburg has shown that the contrast is exaggerated. Both systems acknowledged that authors had right which should be enforced for the public good, and only to the extent that they would promote the public good." James W Harris, *Property and Justice* (Oxford: Oxford University Press, 1996) at 297; Jane C Ginsburg, "A Tale of Two Copyright: Literary Property in Revolutionary France and America" in Brad Sherman & Alain Strowel, eds, *Of Authors and Origins: Essays on Copyright Law* (Oxford: Clarendon Press, 1994). See also Eric E Johnson, "Intellectual Property and the Incentive Fallacy" (2012) 39 Fla St U L Rev 623; James Boyle, "Thomas Jefferson Writes a Letter" in *The Public Domain: Enclosing the Commons of the Mind* (New Haven: Yale University Press, 2008); Susan Scafidi, "Digital Property/Analog History" (2004) 38 Loy LA L Rev 245; Brad Sherman & Lionel Bently, *The Making of Modern Intellectual Property Law* (New York: Cambridge University Press, 1999) at 11-42.

[409] Vaver, *supra* note 237 at 3. Vaver explains, *ibid* at 22-3, that "[s]ince the eighteenth century it has been common in Anglo-American theory to treat IP as the product of competing interests and values." This policy lay the ground for two camps, "One driven by the 'rough practical test that what is worth copying is *prima facie* worth protecting. The second … holds that culture and the economy need a dynamically functioning public domain, so 'care must always be taken to allow … [patent and copyright laws] to be made instrument of oppression and extortion'." Bently & Sherman, *supra* note 406 at 3, offer: "While the law has long granted property rights in intangibles, the law did not accept 'intellectual property' as a distinct and (relatively) non-controversial form of property until the late eighteenth century. In granting property status to intangibles, the question arose as to how and where the boundary lines of the intangible property were to be determined."

a limited protection over only their material expression of such ideas, and only for a limited time.[410] IP theories act as justification, criticism, evaluation (or any combination of these) of the way we restrict IP to resolve this dilemma.

There are many IP theories. For example, one popular moral justification for IP protection is through a creator's natural right to his creation, which society should reward. From natural rights flows a basic assumption about IP that such protection fosters creativity and multiplies creations.[411] David Vaver wonders, however, whether IP protection is even necessary for the creative process, noting that "in the centuries before copyright and patent laws were established or were rigorously enforced, incentive and creative work flourished throughout the world."[412] This position is shared by many scholars,[413] and supported by recent studies.[414]

Beyond understanding the historical development of IP laws, IP theories are crucial for

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[410] Marcus Boon, *In Praise of Copying* (London, UK: Harvard University Press, 2010) at 21. As Vaver expressed: "We know that ideas are not protected once they leave their producer's brain and, when society does protect ideas after they have taken some concrete shape, the protection is always limited in time and space: nobody anywhere has ever argued for worldwide protection of every new idea in perpetuity." Vaver, *supra* note 237 at 15. For further reading see e.g. David Vaver, "Some Agnostic Observations on Intellectual Property" (1991) 6 IPJ 125 at 126-8.

[411] *Eldred v Ashcroft*, 537 US 186 at 214 (2003).

[412] Vaver, *supra* note 237 at 16.

[413] Bently & Sherman, *supra* note 406 at 35-6, opine that "with the advent of the Internet, there are many who think that copyright [though it might be relevant to Trademarks and Patents as well] unjustifiably stifles our ability to make the most of the new environment or that it impinges upon the public domain. Others consider that while some aspects of copyright are justifiable, others are not. Typically, the argument is that copyright law has gone too far." For further reading, see e.g. Samuel E Trosow, "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" (2003) 16 Can JL & Jur 217; Michael A Carrier, "SOPA, PIPA, ACTA, TPP: An Alphabet Soup of Innovation-Stifling Copyright Legislation and Agreements" (2013) 11 Nw J Tech & IP 21.

[414] Jessica Silbey, *The Eureka Myth: Creators, Innovators, and Everyday Intellectual Property* (Stanford: Stanford University Press, 2015) at 79-80 [Silbey, The Eureka Myth]; Julie E Cohen, "Creativity and Culture in Copyright Theory" (2007) 40 UC Davis L Rev 1151; Jeanne Fromer, "A Psychology of Intellectual Property" (2010) 104 Nw UL Rev 1441 at 1443-4; Johnson, *supra* note 408 at 627; Gregory N Mandel, "Left-Brain Versus Right-Brain: Competing Conceptions of Creativity in Intellectual Property Law" (2010) 44 UC Davis L Rev 283 at 285-86; Gregory N Mandel, "To Promote the Creative Process: Intellectual Property Law and the Psychology of Creativity" (2011) 86 Notre Dame L Rev 1999; Sara Stadler, "Incentive and Expectation in Copyright" (2007) 58 Hastings LJ 433; Rebecca Tushnet, "Economies of Desire: Fair Use and Marketplace Assumptions" (2009) 51 Wm & Mary L Rev 513, 515 [Tushnet, Economies of Desire]; Diane L Zimmerman, "Copyright as Incentives: Did We Just Imagine That?" (2011) 12 Theor Inq L 29 [Zimmerman, Copyright as Incentives]. *Contra* Daniel J Hemel & Lisa L Ouellette, "Beyond the Patents-Prizes Debate" (2013) 92 Tex L Rev 303 (challenging evidence supporting nonmonetary motivation of creation. Nevertheless, patents may not be analogous to copyright in this way, since artist creation and invention are not identical exercises).

setting future progress's foundations. In setting those foundations, we should avoid a fixed and inflexible approach to IP theories. Robert Merges describes IP law as "one of those sprawling, chaotic megacities of the developing world … construction cranes are everywhere."[415] Many scholars agree with Merges' claim, arguing that current IP theories offer insufficient philosophical and practical clarity for current problems.[416]

Despite IP law's inner balance being maintained in past decades (albeit not without struggles), society is heading towards difficult stages in its evolution,[417] as technology advances under a rise of capitalism, globalization, and other aspects characterizing modern society. Flexible IP theorization can help. It can assist us to build legal theories supporting those changes and promote humanity to embrace the challenges technology is importing into an already complex and highly-regulated area.

The theoretical discussion, therefore, has significant value.[418] While IP theories on their own merit "have failed to make good on their promises to provide comprehensive prescriptions concerning the ideal shape of intellectual-property law, they can help identify non-obvious attractive resolutions of particular problems."[419] The theoretical discussion can also "catalyse

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[415] Robert P Merges, *Justifying Intellectual Property* (Cambridge, Mass: Harvard University Press, 2011) at 1. For further reading on the legitimacy and status of IP see Adam D Moore, ed, *Intellectual Property: Moral, Legal and International Dilemmas* (Rowman & Littlefield, 1997); Annabelle Lever, ed, *New Frontiers in the Philosophy of Intellectual Property* (Cambridge, UK: Cambridge University Press, 2012).

[416] Pamela Samuelson, "Should Economics Play a Role in Copyright Law and Policy?" (2003) 1 UOLFTJ 1; Richard A Posner & William M Landes, *The Economic Structure of Intellectual Property Law* (Cambridge, Mass: Harvard University Press, 2009) [Landes & Posner, The Economic Structure of IP]; Zimmerman, Copyright as Incentives, *supra* note 414. As Bently & Sherman, *supra* note 406 at 4, state rhetorically "philosophers have typically asked 'why should we grant intellectual property rights?' For philosophers, it is important that this question is answered, since we have a choice as to whether we should grant rights."

[417] One example is the growing impact of amateurism. John Quiggin & Dan Hunter argue that "the rise of amateurism calls into question some fundamental assumptions we have about the public policy of innovation, the way that innovation occurs within society, and the incentives necessary to produce valuable innovations in our society." John Quiggin & Dan Hunter, "Money Ruins Everything" (2008) 30 Hastings Comm & Ent LJ 203 at 205.

[418] As Zemer expressed: "Arguments favoring conferring property rights on intellectual creations are manifold. They contain great value for development of intellectual property systems and shaping their limits." Lior Zemer, "On the Value of Copyright Theory" (2006) 1 IPQ 55 [Zemer, On the Value of Copyright Theory].

[419] Fisher, *supra* note 407.

useful conversations among various people and institutions responsible for the shaping of the law."[420] Through these discussions and conversations among the different "players" (like scholars, judges and legislators) we can discern gaps and inconsistencies in IP theories. I share the views of William Fisher, Zemer and other scholars that no *single* IP theory can provide sufficient legal justification for a given issue, and "only by continuing to discuss the possibility … can we hope to make progress."[421]

Part I, *Searching for Common Ground: Conceptualizing AI*, provides an overview of AI's history and general concept in order to shape it for the legal discussion that follows. But, this dissertation is concerned more specifically with the problems arising when AI and the law – particularly IP law – intersect. These problems are amplifying as non-human actors create works under a regime that only contemplates creation (and its ensuing rights and responsibilities) by and for humans.

Part II places the AI discussion within the IP theoretical map and proposes a broader perspective for AI-IP theory. I argue for developing theoretical approaches to IP in the AI era. First, I explore the "many faces" of current IP theories, reflecting on their underlying bases. Second, I consider if IP theories support allocating IP rights to non-human authors or inventors.[422]

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[420] *Ibid* at 198.

[421] *Ibid* at 199.

[422] The work itself is, generally, considered a "work" under copyright law and thus protected. In scenarios in which a computer program generates the work the rights assigned to the programmer or the corporation that owns the program. However, several other scenarios could challenge granting copyright protection in those computer-generated creations. For example, one can argue that a computer-generated work would not be considered "original" under copyright law. Further, there is a difference between the standard of originality among jurisdictions – the same computer-generated work could be deemed original under UK copyright law but not "creative" under US copyright law (and thus not original). As Andres Guadamuz offers: "All of the above is not problematic for most computer-generated works, particularly those in which the result is the product of the [*human*] author's input. When using graphic editing software to produce a picture, the resulting picture will reflect the creative impulses of artists, reflecting their personality. But, conversely, it is easy to see how a definition of authorship that is completely embedded to personal creativity would spell trouble for computer-generated works that are the result of an advanced artificial intelligence program." See Andres Guadamuz, "Do Androids Dream of Electric Copyright? Comparative Analysis of Originality in Artificial Intelligence Generated Works" (2017) 2 IPQ 169 at 178. Moreover, Kalin Hristov observes that according to the US

In doing so, I address distinct stages in AI's development:

1. AI development's current stage (where, as Pamela Samuelson and Annmarie Bridy explain,[423] copyright protection is not accorded to the AI itself);[424]
2. The impending stage in development of computer-generated works;[425]
3. The stage during which AI is expected to reach human intelligence; and
4. Later possibilities, in which AI and human authors (or inventors) combine, and/or AI achieves superintelligence.

Finally, I look for other alternatives in IP scholarship, mainly whether AI can be provided a limited scope of rights in its creations. Gideon Parchomovsky and Peter Siegelman, for example, offer an

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Copyright Office, *Compendium of US Copyright Office Practices*, 3rd ed (2014) § 306 [*Compendium of US Copyright Office Practices*] (the human authorship requirement), the artwork of an autonomously generated AI creation "are not copyrightable if not directly influenced by human authors." Accordingly, only original works of authorship that were created by human authors can be registered. See Kalin Hristov, "Artificial Intelligence and the Copyright Dilemma" (2017) 57 IDEA 431 at 436. The reasoning for this approach is intriguing: "One example given by the U.S. Copyright Office is a 'weaving process that randomly produces irregular shapes in the fabric without and discernible pattern'. Since chance, rather than the programmer of this 'weaving machine', is directly responsible for its work, the resulting patterns would not be protected by U.S. Copyright. Randomness, just like mutinously learned behavior is something that cannot be attributed to the human programmer of an AI machine." Hence, "the resulting autonomous works are not eligible for copyright protection and fall directly into the public domain." *Ibid* at 437. However, even with AI creations that are not random, the current legal standing of its creation under US copyright law is sketchy at best – "unless AI generated works can directly be attributed to a human author' they would not be copyrightable and would fall into the public domain upon their creation." *Ibid*.

423 Pamela Samuelson, "Allocating Ownership Rights in Computer-Generated Work" (1986) 47 U Pitt L R 1185; Annemarie Bridy, "Coding Creativity: Copyright and Artificially Intelligent Author" (2012) 5 Stan Tech L Rev 1. See also Miller, *supra* note 59; Emily Dorotheou, "Reap the Benefits and Avoid the Legal Uncertainty: Who Owns the Creations of Artificial Intelligence?" (2015) 21 CTLR 85. Bridy explains, at para 51, that "the law as it is currently configured cannot vest ownership of the copyright in a procedurally generated work in the work's author-in-fact, because the work's author-in-fact--a generative software program--has no legal personhood." Samuelson expressed (more than 30 years ago) a firmer opinion, stating that "the [legal] system has allocated rights only to humans for a very good reason: it simply does not make any sense to allocate intellectual property rights to machines because they do not need to be given incentives to generate output. All it takes is electricity (or some other motive force) to get the machines into production. The whole purpose of the intellectual property system is to grant rights to creators to induce them to innovate. The system has assumed that if such incentives are not necessary, rights should not be granted. Only those stuck in the doctrinal mud could even think that computers could be 'authors'." Samuelson, *ibid* at 1200.

424 The current laws recognize the AI or computer creation as a work, assigning copyright to the human owners or the corporations that own the programs. However, if no-human is involved – either in the process of inventing (patents) or creating music/books (copyright) – the works will evidently fall into the public domain since no IP protection is given to non-human creations. In most cases, the laws state specifically that a creator is a *person*. However, in other jurisdictions, copyright laws state that a creator means an individual.

425 In which most AIs will be able to perform tasks with minimal or no human intervention.

integrated approach to IP by "combining various modes of intellectual property protection."[426] Further, Parchomovsky and Alex Stein present a model that "calibrates authors' protection and liability to the originality level of their works." Under this model, "creators of minimally original works will receive little protection and incur greater exposure to liability if sued by others."[427] These approaches to IP might provide a way to solve the AI rights problem by awarding different levels of protection to AI creations.[428]

Theorizing AI-IP presents several challenges. First, few similarities exist between the IP theories discussion and the AI personhood discussion addressed in Part I.[429] Given that establishing AI-IP rights derived from the broader legal context of AI rights, this discussion begins where the AI "personhood" discussion ended.

Second, from a normative perspective, the legal basis for IP rights – to promote the "Progress of Science and Useful Arts" as framed in the US Constitution[430] and to "encourage cultural and technological development" as stated in the EU directive[431] – raises immanent questions: Would IP legal rights incentivize AIs to create or humans to create better AI systems? And, if not, are there any other IP justifications which support IP-AI rights?

Third, how will introducing AI-IP affect the inner balance between authors or inventors and society? AI copyright, for example, might shift the balance toward the public domain (as I will explain further in this part). Those considerations are worth discussing. Finally, because AI is not

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[426] Gideon Parchomovsky & Peter Siegelman, "Towards an Integrated Theory of Intellectual Property" (2002) 88 Va L Rev 1455 at 1458.
[427] Gideon Parchomovsky & Alex Stein, "Originality" (2009) 95 Va L Rev 1497 at 1507.
[428] These suggestions will be most valuable for the second level of AI development, in which humans' effect on the work creation process will be minimal.
[429] Part I, *Searching for Common Ground: Conceptualize AI*, Chapter III (Legal personhood for AI).
[430] US Const art I, § 8.
[431] EU, *Commission Directive (EC) 2001/29/EC of 22 May 2001 on the Harmonisation of Certain Aspects of Copyright and Related Rights in the Information Society*, [2001] OJ, L 167 at preamble 11 [*2001 Directive on Copyright Harmonisation*].

an immediate but a future concern, the question arises whether it will be necessary to change the legal system at that point.

I wish to bring the theoretical discussion, as Zemer suggested, "into contemporary discussion on the future of property regimes"[432] and challenge justifications behind the current copyright regime to address the upcoming change. By reviewing the main theoretical approaches in IP and considering AI's applicability according to these theories, I hope to contribute to an ongoing discussion about IP and build a balanced approach between technology and IP.

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[432] Zemer, On the Value of Copyright Theory, *supra* note 418.

2.2 IP THEORY'S MANY FACES

2.2.1 Introduction

Peter Menell divides the approaches to IP theory into utilitarian and non-utilitarian camps.[433] The utilitarian approach offers "the greatest good for the greatest number."[434] Utilitarian theories (Richard Posner and William Landes) endorse the creation of IP rights to balance the economic interests of rights-holders and the interest of the public.[435] IP utilitarianism's underlying reasoning assumes that IP monopolization produces incentives to create; accordingly, it requires that we accept such monopolization to produce creation. This assumption informs the basic economic approaches presented below.

Non-utilitarian theories prioritize cultural or social concerns over utilitarian "greater good" maximization. They include (non-exhaustively): Lockean theory (concerned with the connection between an individual's labour and its fruits); the personhood approach (which similarly connects labour to its fruits, albeit emphasizing the centrality of such labour's expression to the individual's "persona"); social-institutional planning (aimed at maintaining a strong civic culture that derives benefits from balancing social and institutional IP regimes); and, traditional proprietarianism (which sees IP as a form of property).[436]

The continued struggle and constant tension between the two camps influenced IP law's development in recent decades.[437] According to Merges, only three justifications for IP rights are

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[433] Peter S Menell, "Intellectual Property: General Theories" in Boudewijn Bouckaert & Gerrit De Geest, eds, *Encyclopedia of Law & Economics: Volume II* (Cheltenham: Edward Elgar, 2000); Zemer, On the Value of Copyright Theory, *supra* note 418 at 56, challenges whether IP theories can be divided into categories: "It is arguable whether intellectual property theory lends itself to categorization. Theories are often related to each other, and there will always be at least one approach that stands independently of any existing theory. However, we cannot avoid the fact that several theoretical patterns dominate the present copyright discourse."

[434] Merges, *supra* note 415 at 2.

[435] Zemer, On the Value of Copyright Theory, *supra* note 418 at 57.

[436] In Copyright scholarly there are a few further theoretical approaches that developed within this scholarly debate, which I shall address in the following chapters.

[437] Lior Zemer, "Dialogical Transactions" (2016) 95 Or L Rev 141 at 143-144 [Zemer, Dialogical Transactions].

important: Lockean appropriation, Kantian individualism and Rawlsian distributive effects. Merges argues against utilitarianism as a fundamental IP theory, stating that its "empty promise and ethical holes […] are just too glaring."[438] Fisher opines that utilitarian and Lockean theories have enjoyed an "aura of neutrality",[439] so courts more often – particularly in the US, the UK and Canada, for the past 20 years – turn to those theories when faced with difficult legal cases.[440]

Behavioural theories provide a different basis for IP, by exploring behavioural effects on the development of laws and norms to understand motivational forces underlying human or AI

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[438] Merges, *supra* note 415 at 307. Johnson, *supra* note 408 at 635-40, provides a fascinating reading about the history of IP and the development of the incentive theory. Johnson argues that copyright laws "had little or nothing to do with careful economic reasoning and had everything to do with political reordering and special-interest jockeying." Johnson suggests that incentive theories are no longer able to provide the flourish in creative production in cyberspace as an example to his statements. See also Paul Goldstein*, Copyright's, Highway: From Gutenberg to the Celestial Jukebox* (Stanford: Stanford University Press, 2003) at 11.

[439] Fisher, *supra* note 407, especially the Lockean based theories.

[440] Zemer, On the Value of Copyright Theory, *supra* note 418 at 57-8. Zemer shows that the utilitarian approach was followed by the US courts, as its logic was endorsed by the US Constitution. See e.g. *Sony Corp of Am v Universal City Studios, Inc,* 464 US 417 at 450 (1984) and *Harper & Row, Publishers, Inc v Nation Enterprises*, 471 US 539 at 558 (1985). In *Feist Publications, Inc v Rural Telephone Service Co*, 499 US 340 at 349-350 (1991), SCOTUS concluded that "the primary objective of copyright is not to reward the labors of authors, but to promote the Progress of Science and Useful Arts." Daniel J Gervais, "Feist Goes Global: A Comparative Analysis Of The Notion Of Originality In Copyright Law" (2002) 49 CSUSA 949 at 951, suggests: "The main reason why the circuits were split among between the two main doctrines prior to Feist is that there are two principal justifications - and, therefore, bases - for copyright protection: either it is a reward/incentive of the effort or investment made, or a reward/incentive for adding to the pool of creative works available to the 'public'." Roberta Kwall argues that the "American copyright law rewards economic incentives almost exclusively and lacks adequate moral rights protections … Steeped in a utilitarian tradition, copyright law in the United States is concerned with calibrating the optimal level of economic incentive to promote creativity. Such a perspective emphasizes the merchandising and dissemination of intellectual works." Roberta R Kwall, *The Soul of Creativity: Forging a Moral Rights Law for the United States* (Stanford: Stanford University Press, 2010) at xiii [Kwall, The Soul of Creativity]. See also Shyamkrishna Balganesh, "The Normative Structure of Copyright Law" in Shyamkrishna Balganesh, ed, *Intellectual Property and the Common Law* (Cambridge University Press, 2013) at 313. Canada Supreme Court (SCC) in *CCH Canadian Ltd v Law Society of Upper Canada*, 2004 SCC 13 [*CCH*], referred to Locke's theory in establishing the scope of copyright protection in Canada. However, the court in *CCH* "eludes the philosophical and practical implications of a sweat-based approach to originality. Philosophically, awarding copyright to works that involved mere 'sweat of the brow' may appear to endorse a 'natural rights or Lockean theory of 'just desserts', namely that an author deserves to have his or her efforts in producing a work rewarded … By rejecting 'sweat of the brow', and by dropping 'labour' from the components that constitute originality, the Supreme Court's decision could represent a significant step for Canadian copyright policy: a step away from labour and the author's claim of right; away from the expansion of copyright's scope and the diminishment of the information commons; and towards the public interest, the public domain, and the purposive interpretation of copyright doctrine." Carys J Craig, "Resisting Sweat and Refusing Feist: Rethinking Originality after CCH" (2007) 40 UBC L Rev 69 at 98.

behaviour.[441] There is already ample research about behavioural impacts on various legal fields like criminal and tax law.

Contrasting these theories, the ensuing discussion will consider the differences across jurisdictions and disciplines, as Abraham Drassinower describes:[442]

> *"[O]n the one hand, in common law jurisdictions, copyright is regarded as a policy instrument designed to serve the public interest in the production and dissemination of works of authorship … [O]n the other hand, in civil law jurisdictions, authorial entitlement is conceived not instrumentally but as judicial recognition of rights inherent in the act of authorship as such."*

I echo Drassinower's words. We face two distinct perspectives affecting the way IP laws are shaped. It is reasonable to argue that, in the coming era, these differences will have to be partly reconciled to clear the way for a more inclusive approach that can be shared internationally by humans and non-humans alike. An alternative vision is a transcontinental IP theory in which two distinct approaches to IP would be available – the US and the EU. Under this vision, it seems plausible that non-human creations would not be widely recognized in the EU, given the EU's natural law inclination. It would also be very interesting to envision where Canada and the past-Brexit UK would fall on the IP US-EU scale.

2.2.2 Four IP Justifications

Lionel Bently and Brad Sherman explain that IP justifications "fall into one of two general categories": (1) "ethical and moral arguments" or (2) "instrumental justifications that focus on the

[441] Lawrence Becker argued: "So if property-as-personality … turns out to be a dead end, perhaps we should dispense with the search for a deep justification for property rights (from metaphysics, moral psychology, or whatever) and focus on the behavioral surface […]." Lawrence C Becker, "Too Much Property" (1992) 21 Phil & Pub Aff 196 at 206.

[442] Abraham Drassinower, *What's Wrong With Copying?* (Cambridge, Mass: Harvard University Press, 2015) at 145.

fact that intellectual property induces or encourages desirable activities."[443] Fisher contends that there are four theoretical justifications for IP rights:[444] utilitarianism,[445] natural law (Labour based justifications), personhood, and social planning.

My discussion emphasizes IP theory's main philosophical arguments. I choose Fisher's paper as the cornerstone to the theoretical discussion below, though I am aware of other approaches to IP and will keep those in mind, too. The theoretical outline below will seek to provide a compass for IP discussion within the AI debate that follows.

2.2.2.1 The Utilitarian Approach

Influenced by Jeremy Bentham's writings, utilitarianism aspires to achieve "the greatest good for the greatest number"[446] to maximize social welfare.[447] It "endorse[s] the creation of intellectual property rights in order to induce innovation and intellectual productivity."[448] By nature, utilitarianism is based on consequentialist arguments, as "good is whatever yields the greatest net utility."[449] The patent system, for example, is justified by providing inventors incentives to invest in research and disclose valuable new products or processes to the public.[450] A pharmaceutical

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[443] Bently & Sherman, *supra* note 406 at 5.
[444] Fisher, *supra* note 407.
[445] Jeremy Bentham, *An Introduction to the Principles of Morals and Legislation* (Kitchener, ON: Batoche Books, 2000).
[446] This statement originated from the early writings of Francis Hutcheson: "In comparing the moral Qualities of Actions, in order to regulate our Election among various Actions propos'd, or to find which of them has the greatest moral Excellency, we are led by our moral Sense of Virtue to judge thus; that in equal Degrees of Happiness, expected to proceed from the Action, the Virtue is in proportion to the Number of Persons to whom the Happiness shall extend… and in equal Numbers, the Virtue is as the Quantity of the Happiness, or natural Good; or that the Virtue is in a compound Ratio of the Quantity of Good, and Number of Enjoyers. In the same manner, the moral Evil, or Vice, is as the Degree of Misery, and Number of Sufferers; so that, that Action is best, *which procures the greatest Happiness for the greatest Numbers*; and that, worst, which, in like manner, occasions Misery." [Emphasis added]. Francis Hutcheson, *An Inquiry into the Original of Our Ideas of Beauty and Virtue* (1726) Treatise II, Section III, VIII.
[447] One divergent of utilitarianism is the welfarism approach (or consequentialism) – IP as a mechanism to promote welfare and social causes. See Christopher Buccafusco & Jonathan Masur, "Intellectual Property Law and the Promotion of Welfare" (2017) University of Chicago Public Law & Legal Theory Paper Series No 607.
[448] Zemer, On the Value of Copyright Theory, *supra* note 418 at 57-8.
[449] Zemer, On the Value of Copyright Theory, *supra* note 418 at 57-8.
[450] Bently & Sherman, *supra* note 406 at 5.

company, for example, "will invest research and development costs in the manufacture of a new drug only if it is granted a patent."[451] Lawmakers are expected to balance "the power of exclusive rights to stimulate the creation of inventions and works of art" and the "offsetting tendency of such rights to curtail widespread public enjoyment of those creations."[452]

The utilitarian approach is well-grounded in UK and US copyright laws. It can be traced back to the *Statute of Anne, 1709*,[453] and the US Constitution.[454]

Scarcity is an essential element on the stimulation side of utilitarianism's balancing act. For example, invention is scarce because it demands research and development, which consumes resources, which in turn consumes opportunity costs. Utilitarianism, therefore, must consider scarcity and appropriately allocating IP rights to produce "the greatest net 'X' (utility, wealth, and

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[451] Harris, *supra* note 408 at 297. James W Harris suggests that IP protection is justified if "considerations parallel to the five conditions for augmenting social wealth through incentives apply." Harris describes the five conditions as follows: "1. X does work in consideration of a payment of Y pounds. 2. X would not have done the work for any lesser incentive. 3. On the available labour-market, no-one else could have been hired to do the work for any sum smaller than Y. 4. The work adds to total social wealth. 5. The addition enables justice costs to be discharged which could not have been met without it." Harris, *ibid* at 294.

[452] Fisher, *supra* note 407 at 169. Palmer explains "the utility gains from increased incentives for innovations must be weighed against the utility losses incurred from monopolization of innovations and their diminished diffusion." Tom G Palmer, "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" (1990) 13 Harv JL & Pub Pol'y 817 at 849-850.

[453] The *Statue of Anne 1709*, considered the first modern copyright Act, reads as follows: "An Act for the Encouragement of Learning, by vesting the Copies of printed Books in the Authors, or Purchasers, of such Copies, during the Times therein mentioned." See also Harry Ransom, *The First Copyright Statute: An Essay on the Act for the Encouragement of Learning* (Austin: The University of Texas Press, 1956) at 1709; Ronan Deazley, *On the Origin of the Right to Copy: Charting the Movement of Copyright Law in Eighteenth-century Britain (1695-1775)* (Portland: Hart Publishing, 2004) at 31- 50; Johnson, *supra* note 408.

[454] Zemer, On the Value of Copyright Theory, *supra* note 418 at 57. The US Constitution, *supra* note 430, declares that the Congress is empowered "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." On the interpretation of the US Constitution clause see e.g. Karl B Lutz, "Patents and Science: A Clarification of the Patent Clause of the U.S Constitution" (1949) 18 Geo Wash L Rev 50; Edward C Walterscheid, "To Promote the Progress of Science and Useful Arts: The Background and Origin of the Intellectual Property Clause of the United States Constitution" (1994) 2 J Intell Prop 1; Alan L Durham, "'Useful Arts' in the Information Age" (1999) BYUL Rev 1419. The utilitarian argument developed from early work of important legal philosophers such as Jeremy Bentham, *A Manual of Political Economy* (New York: Putnam, 1839); John Stuart Mill, *Principles of Political Economy*, 5th ed (York: Appleton, 1862), and Arthur C Pigou, *The Economics of Welfare*, 2nd ed (London: Macmillan & Co., 1924). Landes and Posner expressed similar ideas in relate to trademark in their earlier work, see e.g. William M Landes & Richard A Posner, "Trademark Law: An Economic Perspective" (1987) 30:2 JL & Econ 265. See also Mark Lemley, "Property, Intellectual Property, and Free Riding" (2005) 83 Tex L Rev 1031 [Lemley, Property, IP and Free Riding]. I will develop the "free-riding" argument in the following paragraphs.

so on) […] at the lowest cost."[455] Once ideas are shared, they become free to the public.

Since many aspects of IP are easy to copy, it is important to create artificial scarcity "to protect the right of an author or composer of any literary, artistic, or scientific work"[456] and prevent "free riders". As James Harris elegantly expresses, "Once the idea … cease[s] to be scarce, the law, through such devices as copyright, design right, patents, trade marks, and so forth, surrounds it with trespassory rules prohibiting unauthorized use."[457]

Concerning mass information's abundance,[458] Mark Lemley identifies the resulting potential irrelevance of the basic economic rule of scarcity for IP[459] "when both the cost of creation and the cost of distribution fall below a certain point."[460] Lemley's "world without scarcity" will require a reworking of basic economics,[461] perhaps one that abandons IP protection.

Exploitation by "free riders" is a concern on the public enjoyment side of utilitarianism's scale. William Landes and Richard Posner emphasized the vulnerable nature of public IP goods: "While the cost of creating a work subject to copyright protection … is often high, the cost of reproducing the work, whether by the creator or by those to whom he has made it available, is often low. And once copies are available to others, it is often inexpensive for these users to make additional copies."[462] Lemley agrees, adding that "the ease of copying means producers won't be

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455 Palmer, *supra* note 452 at 849-850 (discusses the concept of scarcity in the utilitarian argument).
456 Harris, *supra* note 408.
457 *Ibid* at 44. Further, "Once an idea is fully in the public domain, it ceases to be scarce and in that sense an item of social wealth which must be allocated between competing claimants. An ideational entity differs from tangible object in that mere uses of it are not naturally competitive." *Ibid* at 43
458 Lemley, IP in a World Without Scarcity, *supra* note 27.
459 *Ibid* at 462.
460 *Ibid* at 506, Lemley further explains that "[i]t simply means that how much (if any) IP we need in a given industry is a function of the characteristics of that industry. As those characteristics change, so must IP."
461 *Ibid* at 462 and 465, outlines three new technologies that promise significant changes: 3D printing, synthetic biology, and bioprinting and robotics, arguing that "[c]ombine these four developments … and it is entirely plausible to envision a not-too-distant world in which most things that people want can be downloaded and created on site for very little money – essentially the cost of raw materials. Jeremy Rifkin calls this the 'zero marginal cost society'."
462 William M Landes & Richard A Posner, "An Economic Analysis of Copyright Law" (1989) 18 J Leg Stud 325 at 326. See also Posner & Landes, The Economic Structure of IP, *supra* note 416; Niva Elkin-Koren & Eli M Salzberger,

able to charge enough to recoup their investment in making the thing in the first place."[463] The legal and economic solution to the "free riders" problem, Anne Barron suggests, is to "institute rights of private property in relation to these goods."[464] However, the way to that and to what extent, is under considerable disagreement.

In a more recent paper, Lemley further criticizes the semi-"religious" adherence to utilitarianism as the leading IP theoretical justification.[465] He calls for a more scientific basis approach to IP regulation,[466] stating that despite gathering an increasing amount of data and information on every aspect of IP and creative and innovative markets,[467] our "faith-based" IP approach remains largely unchanged.[468] Robert Merges challenges Lemley's faith-based IP argument, which is standing against the very essence of deontological theories, stating that "[i]f moral rules are to guide us, and if we follow those rules in deciding on a certain 'system,' it is then precisely and exactly the case that that system 'is better for the world than other systems'."[469]

The Law and Economics of Intellectual Property in the Digital Age: The limits of Analysis (New York: Routledge, 2012) (the authors discuss the incentives paradigm in the new digital era, explaining the paradigm within the context of the contemporary challenges in IP); Frederic M Scherer, *Industrial Market Structure and Economic Performance*, 2nd ed (Chicago: Rand McNally College Pub Co, 1980) at 444 (Scherer explains that if strict competition will prove to be "too" efficient we might harm the incentive to create).

463 Lemley, IP in a World Without Scarcity, *supra* note 27 at 467.

464 Anne Barron, "Copyright Infringement, 'Free-Riding' and the Lifeworld" in Lionel Bently, Jennifer Davis & Jane C Ginsburg, eds, *Copyright and Piracy: An Interdisciplinary Critique* (New York: Cambridge University Press, 2010) at 94. For further discussion about copyright's incentive regime. See Glynn S Lunney, "Reexamining Copyright's Incentives-Access Paradigm" (1996) 49 Vand L Rev 483. Mark Lemley rejects the "free riding" paradigm arguing that "the rhetoric of free riding seems unlikely to offer any substantial aid and quite likely to lead us astray. The concept of free riding focuses on the economic effects on the alleged free rider-whether the accused infringer obtained a benefit from the use of the invention, and if so whether it paid for that benefit. But that is not where we should be focusing our attention in calibrating intellectual property. The proper focus is on the intellectual property owner, not the accused infringer." Lemley, Property, IP and Free Riding, *ibid* at 1032 and 1068.

465 Mark A Lemley, "Faith-Based Intellectual Property" (2015) 62 UCLA L Rev 1328 at 1337–43 [Lemley, Faith-Based IP]. Other prominent scholars in the US criticize the profound influence of the utilitarian approach. See, for example, Amy Kapczynski, "The Cost of Price: Why and How to Get Beyond Intellectual Property Internalism" (2012) 59 UCLA L Rev 970.

466 Lemley, Faith-Based IP, *supra* note 465 at 1331, stating that "[i]n a market-based economy, regulation requires some cost-benefit justification before we accept it."

467 *Ibid* at 1332.

468 *Ibid* at 1335.

469 Robert P Merges, "Against Utilitarian Fundamentalism (Symposium)" (2017) 90 St John's L Rev 681 at 687 [Merges, Against Utilitarian Fundamentalism].

These concerns – at each extreme of utilitarianism's required balance – help explain the theory's aim: Allocating time-limited exclusivity to creators during which they may recover costs and enjoy the benefits of their works to minimize inefficiency and deterrence of creation.

2.2.2.2 The Natural Law Theory

The second theoretical justification for IP is the Natural Law theory which utilizes labour-based justifications, which originated in John Locke's philosophy.[470] Locke's theory – which significantly influenced the development of legal thought – is subject to a wide range of different interpretations and views.[471] For example, an instrumental interpretation deems rewarding hard work as necessary to elicit labour in the first place.[472] Alternatively, a normative interpretation considers hard work as deserving of a just reward by right.[473]

The labourer's right is conditional, subject to Locke's proviso: She ought only to take and use what is needed;[474] and she must ensure that "there is enough and as good left in common for

[470] Fisher, *supra* note 407 at 170: "[A] person who labors upon resources that are either unowned or 'held in common' has a natural property right to the fruits of his or her efforts."
[471] Lockean thought can be found in many aspects of legal and political studies. See, for example, Peter R Anstey, *John Locke and Natural Philosophy* (Oxford: Oxford University Press, 2011); James Tully, *An Approach to Political Philosophy: Locke in Context* (Cambridge: Cambridge University Press, 1993). In IP scholarly see e.g. Wendy Gordon, "Render Copyright unto Caesar: On Taking Incentives Seriously" (2004) 71 U Chi L Rev 75; Jacqueline Lipton, "Information Property: Rights and Responsibilities" (2004) 56 Fla L Rev 135; Benjamin G Damstedt, "Limiting Locke: A Natural Law Justification for the Fair Use Doctrine" (2003) 112 Yale L J 1179; Abraham Drassinower, "A Right-Based View of the Idea/Expression Dichotomy in Copyright Law" (2003) 16 Can JL & Jur 3; Carys J Craig, "Locke, Labour and Limiting the Author's Right" (2002) 28 Queen's LJ 1 [Carys, Locke, Labour and Limiting the Author's Right].
[472] Justin Hughes, "Philosophy of Intellectual Property" (1988) 77 Geo LJ 287 at 296.
[473] Robert P Merges, "Locke Remixed ;-)" (2007) 40 U C Davis L Rev 1259 at 1265 [Merges, Locke Remix]. See e.g. Richard A Epstein, "Liberty Versus Property? Cracks in the Foundations of Copyright Law" (2005) 42 San Diego L Rev 1. Zemer, On the Value of Copyright Theory, *supra* note 418 at 62, explains: "Locke tells his readers that in the state of nature men share a common right in all things. Thus, justifying the individual's right to property is notoriously difficult: once one takes a particular item from the common, one violates the right of other commoners, to whom this particular item also belongs. Locke resolves this seeming contradiction by introducing the idea of expenditure of labour. Labour justifies the penetration of a physical object into the labourer's realm, and the result is ownership – the deer the Indian killed is his in the sense that it is a part of himself, and a plan for a tulip garden in the centre of Brussels is the planner's own, as it now constitutes part of himself. In essence, Locke refutes the theory of universal compact as a necessary condition for legitimate appropriation."
[474] As Locke, *supra* note 258 at 136, argues: "Nothing was made by God for man to spoil or destroy."

others."[475] Some deny such a proviso.[476] Robert Nozick interprets Locke's proviso as only limiting the justification for acquiring property by labouring when others escape "net harm" suffering. In other words, the proviso is violated if the labourer is unjustly enriched.[477] Allocating patent rights to inventors, for example, abides by the proviso because the invention only came into existence due to the inventor's efforts; inventor enrichment (ownership of the patent monopoly) equals a corresponding benefit to the public (disclosure of the invention) which justifies the corresponding deprivation (unfettered access to the invention). Adam Moore interpreted the proviso differently as a necessary condition, arguing that "[i]f the appropriation of an unowned object leaves enough and as good for others, then the acquisition and exclusion is justified."[478]

Two limitations applicable to IP theory develop from Locke's proviso. Nozick identifies the first as occurring in simultaneous independent creation.[479] For example, normally one inventor appropriating the work of another is enriched at the expense of the other's ability to use his own invention. If two inventors create the same invention independently, however, each must be allowed to fully use and sell their inventions – despite the adverse effect on either inventor's

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475 *Ibid* at 134.
476 Merges, Locke Remix, *supra* note 473. See also Wendy J Gordon, "A Property Right in Self-Expression: Equality and Individualism in the Natural Law of Intellectual Property" (1993) 102 Yale L J 1533 at 1545: "To analyze whether this conception can serve as a tenable guide for modern decisions about the ethics of property, three issues must be addressed. First, a strict no-harm rule merely enshrines a status quo, so that Locke's natural right against harm is unpersuasively overbroad. What needs to be established is not simply whether harm is done, but rather whether there is an *unjustified* or *wrongful* harm. Second, labor is not itself property. Therefore, even if persons are entitled to be free of some kinds of harm, it remains to be shown that the same right pertains to their labor. Third, it is possible that a harm-based argument for property cannot validate intellectual property, for the "public goods" characteristics of intangible creations make them infinitely capable of being shared without depriving the initial creator of their use."
477 Robert Nozick, *Anarchy, State, and Utopia* (New York: Basic Books, 1974) at 178-182. Fisher, *supra* note 407 at 171 describes "net harm" as "such injuries as being left poorer than they would have been under a regime that did not permit the acquisition of property through labor or a constriction of the set of resources available for their use but does not include a diminution in their opportunities to acquire property rights in unowned resources by being the first to labor upon them."
478 Adam Moore, "Towards A Lockean Theory of Intellectual Property" in Adam Moore, ed, *Intellectual Property: Moral Legal and International Dilemmas* (Lanham, Md: Rowman & Littlefield, 1997) at 3. Moore explains that "[t]he role of the proviso is to stipulate one possible set of conditions where the prima facie claim remains undefeated."
479 Nozick, *supra* note 477 at 178.

monopoly – "[o]therwise the assignment of the patent to the first inventor would leave [the second inventor] worse off."[480] Nozick identifies a second limitation required on the duration of IP protection that "approximates how long it would have taken, in the absence of knowledge of the invention, for independent discovery."[481]

Lockean theory has boundaries beyond its proviso; difficulties arise when calculating the appropriate mix of labour with property.[482] For example, Nozick wonders whether "[b]uilding a fence around a territory presumably would make one the owner of only the fence (and the land immediately underneath it)."[483] Perhaps, under this example, the builder may even lose entitlement to the fence he built,[484] unless the labour improves – or increases the value of – the property underneath.[485] In many ways,[486] Nozick's interpretation of utilitarianism for IP theory shares Adam Smith's "free market" (liberty) philosophy, rejecting Rawls's theory for a more egalitarian society.

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[480] Fisher, *supra* note 407 at 171. The problem with simultaneous inventions in patent law is establishing who files the patent or discovers the patent first. Further, this situation poses an intriguing questions both normatively and doctrinally: Do both inventors equally deserve patent protection? And if so, could the rewards from patenting the two inventors satisfy their individual investment in the patent (provide adequate reward)? Fisher states that "implementation of the first of these limitations would require a substantial reform of current patent law which, unlike copyright law, does not contain a safe harbor for persons who dream up the same idea on their own." It should be noted, however, that Canadian patent law does have a limited safe harbor for prior use making "good-faith acquirers or independent inventors … personally protected in respect of some acts done before a patent's claim date, with or without the patent holder's consent." See Vaver, *supra* note 237 at 398-9.
[481] Nozick, *supra* note 477 at 182.
[482] In that way, one might argue that even in scenarios with minimal human input, humans might be able to own the output of the computer-generated program.
[483] Nozick, *supra* note 477 at 174.
[484] *Ibid* at 174-5. In debating his philosophical thesis, Nozick provides his famous allegory: "If I own a can of tomato juice and spill it in the sea so that its molecules (made radioactive, so I can check this) mingle evenly throughout the sea, do I thereby come to own the sea, or have I foolishly dissipated my tomato juice?"
[485] *Ibid* at 175: "The crucial point is whether appropriation of an unowned object worsens the situation of others. Locke's proviso that there be 'enough and as good left in the common for others'… is meant to ensure that the situation of others is not worsened."
[486] Anupam Chander & Madhavi Sunder, "Is Nozick Kicking Rawl's Ass? Intellectual Property and Social Justice" (2007) 40 UC Davis L Rev 563 at 567.

Utilitarianism's reward for labour seems negotiable, by some accounts. Take Edwin Hettinger's example: "One does not create 99 percent of the value of an apple by picking it off a tree, though some human effort is necessary for an object to have value for us."[487] It is appropriate to translate this example into the notion that an IP labourer with an acknowledged right to fruits of his labour is not necessarily entitled to the *entirety* of the intellectual object's value.[488] Hettinger supports the idea further by emphasizing that "works are not created in a social vacuum: authors interact and converse with other creative individuals, enclosing ideas and other social facts received from the common stock."[489] In other words, the quantum of "fruits" with which to reward an IP labourer "is a question of social policy; it is not solved by simply insisting on a moral right to the fruits of one's labor."[490]

2.2.2.3 The Private Property Theory

The third approach derives from Kantian and Hegelian philosophy.[491] According to Hegel and

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[487] Hettinger, *supra* note 407 at 37. Locke believes that "until labored on, objects have little human value, at one point suggesting that labor creates 99 percent of their value."

[488] *Ibid* at 38.

[489] Zemer, Dialogical Transactions, *supra* note 437 at 160. In his early work, Zemer argues that the Lockean theory provides "significant recognition for the public role in the making of authorship and art … [and strengthen] the role played by a society's shared pool of ideas and experiences in the creation of new works." Lior Zemer, "The Making of a New Copyright Lockean" (2006) 29 Harv JL & Pub Pol'y 891 at 892-3 [Zemer, The Making of a New Copyright Lockean]. Carys Craig suggests that "[w]hen the author creates original expression in the form of literature, art, drama or music, she is engaged in an *intra*personal dialogue (developing a form of personal narrative by drawing upon experience, situation, and critical reflection) and an *inter*personal dialogue (drawing upon the texts and discourses around her to communicate meaning to an anticipated audience)." Carys Craig, *Copyright, Communication and Culture: Towards a Relational Theory of Copyright Law* (Cheltenham, UK: Edward Elgar Publishing, 2011) at 53-4.

[490] Hettinger, *supra* note 407 at 39. Hettinger concludes, *ibid* at 40: "In short, a laborer has a prima facie natural right to possess and personally use the fruits of her labor. But a right to profit by selling a product in the market is something quite different. This liberty is largely a socially created phenomenon. The 'right' to receive what the market will bear is a socially created privilege, and not a natural right at all. The natural right to possess and personally use what one has produced is relevant to the justifiability of such a privilege, but by itself it is hardly sufficient to justify that privilege." Adam Mossoff claims that the Lock's labor theory discussion was neglected by philosophers and offers a concise summary of the philosophical debate. See Adam Mossoff, "Saving Locke from Marx - The Labor Theory of Value in IP Theory" (2012) 29:2 Soc Phil & Pol'y 283.

[491] Hegel focuses on the individual's will as the most important element in its existence. Hence, it is important to establish if AI could express Hegelian "will". Hegel, *supra* note 257. See also Robert R Williams, *Hegel on the Proofs and Personhood of God: Studies in Hegel's Logic and Philosophy of Religion* (Oxford: Oxford University Press, 2017); Kim Treiger-Bar-Am, "Kant on Copyright: Rights on Transformative Authorship" (2007) 25 Cardozo Arts & Ent LJ 1059.

Kant, allocating private property rights to IP is justified by allowing "the satisfaction of some fundamental human needs."[492] The Hegelian approach is more concerned with the individual's rights rather than social welfare.

Fisher confirms the application of these approaches to IP rights by justifying them on two grounds: (1) "they shield from appropriation or modification artifacts through which authors and artists have expressed their 'wills' (an activity thought central to 'personhood')"; and (2) "they create social and economic conditions conducive to creative intellectual activity, which in turn is important to human flourishing."[493]

In other words, IP protections guard the creators' personal cores, thereby encouraging their cultural and intellectual creation.

Private property may appear like labour theory, since it similarly maximizes creation by rewarding creators with protection. But, private property takes a less economic, more personal approach to endorse a perhaps stronger entitlement for labourers. Justin Hughes – critical of rigorous fixation to Lockean theory to justify IP[494] – explained that the "most powerful alternative to a Lockean model of property is a personality justification" because it "posits that property

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[492] Fisher, *supra* note 407 at 171. There is an important difference between the Lockean approach and the Hegelian approach to property, as Margaret Radin explains: "The principal difference between the theories of Locke and Hegel is that for Locke the source of entitlement is labor, whereas for Hegel it is will. The Lockean individual has a natural right to property and broad negative freedom regarding that right. Hegel's notion of rights-autonomy or freedom in the positive sense-is logically bound up with entitlement to external objects." Margaret J Radin, "Property and Personhood" (1982) 34 Stan L Rev 957 at 961 [Radin]; Margaret J Radin, *Reinterpreting Property* (University of Chicago Press, 2009); Margaret J Radin, "Market Inalienability" (1987) 100 Harv L Rev 1849; See also Palmer, *supra* note 452 at 838: "Personality does not simply require external objects for its development. Its development is its objectification through externalization of its will." Jeffery D Jones, "Property and Personhood Revisited" (2011) 1 Wake Forest J L & Pol'y 93.

[493] Fisher, *ibid*. See also Jeremy Waldron, *The Right to Private Property* (New York: Oxford University Press, 1988).

[494] Hughes, *supra* note 472 at 330: "Those who try to apply Locke to all modern property end up multiplying distinctions like pre-Copernican astronomers calculating celestial orbits with their Ptolemaic epicycles. At some point, it becomes easier to reorient one's universe."

provides a unique or especially suitable mechanism for self-actualization, for personal expression, and for dignity and recognition as an individual person."[495]

Expanding on Hughes's interpretation of Hegelian philosophy, Fisher offers principal guidelines to shape a better IP system. First, IP should differentiate between highly expressive intellectual activities (writing novels) to less expressive activities (genetic research). On a spectrum between the two, the latter should be accorded lesser protection. Second, a person's public image ("including his physical features, mannerisms, and history",[496] some facets of which result from little labour),[497] should be given stronger protection since it reflects their "persona" – an important "receptacle for personality".[498] Third, "[a]uthors and inventors should be permitted to earn respect, honor, admiration, and money from the public by selling or giving away copies of their works, but should not be permitted to surrender their right to prevent others from mutilating or misattributing their works."[499] Notably, this last guideline uses the language of copyright's moral rights.

Margaret Radin reformulated Hegel's approach to develop the concept of a person.[500] Radin explains that "[i]n Roman law, persona came to mean simply an entity possessing legal

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495 *Ibid*.
496 *Ibid* at 340.
497 *Ibid* at 340-1: "[…] the persona is the ideal property for the personality justification. No intermediary concepts such as 'expression' or 'manifestation' are needed: the persona is the reaction of society and a personality. Property rights in the persona give the individual the economic value derived most directly from one's personality. As long as an individual identifies with his personal image, he will have a personality stake in that image."
498 Fisher, *supra* note 407 at 172.
499 *Ibid*. Hughes, *supra* note 472 at 350: "The personality theory provides a better, more direct justification for the alienation of intellectual property, especially copies. The alienation of copies is perhaps the most rational way to gain exposure for one's ideas. This is a non-economic, and perhaps higher, form of the idea of recognition: respect, honor, and admiration. Even for starving artists recognition of this sort may be far more valuable than economic rewards. Two conditions appear essential, however, to this justification of alienation: first, the creator of the work must receive public identification, and, second, the work must receive protection against any changes unintended or unapproved by the creator."
500 This discussion is of great value for establishing copyright protection for AI, as it examines the possible connection between the concept of a person to the legal rights that derived from that concept.

rights and duties. Today it commonly signifies any human being."[501] Radin further outlines four main conceptions of a person:

a. *The rights-holder*. Kant argues that the person serves as a rational free agent and his existence is an end it itself. Accordingly, "personhood has no component of individual human differences, but rather by definition excludes the tastes, talents, and individual histories that differentiate one from another";[502]

b. *The thinking, intelligent being* (*i.e.*, having self-consciousness and memory). According to Locke,[503] consciousness is an inseparable element, as it is "impossible for anyone to perceive, without perceiving that he does perceive";[504]

c. *The human body*. According to Radin, recognizing someone as a person requires one "to attribute bodily continuity to it";[505]

d. *The future projection* (one on whom we may "project a continuing life plan into the future").[506] Radin contends that "what counts in recognizing something as a person is a consistent character structure. Persons are what they are in virtue of their past and future integrated by their

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[501] Radin, *supra* note 492 at 962.
[502] *Ibid*. Kant explains: "Beings whose existence depends not on our will but on nature's, have nevertheless, if they are irrational beings, only a relative value as means, and are therefore called things; rational beings, on the contrary, are called persons, because their very nature points them out as ends in themselves, that is as something which must not be used merely as means, and so far therefore restricts freedom of action (and is an object of respect)." Immanuel Kant, *Fundamental Principles of the Metaphysics of Morals*, translated by Thomas Kingsmill Abbott (Raleigh, NC: Alex Catalogue, 1990) at 32.
[503] Radin, *supra* note 492 at 963. In reflecting about personal identity Locke explains: "[T]o find wherein personal identity consists, we must consider what person stands for; which, I think, is a thinking intelligent being, that has reason and reflection, and can consider itself, as itself, the same thinking thing in different times and places; which it does only by that consciousness which is inseparable from thinking, and, as it seems to me, essential to it; it being impossible for any one to perceive, without perceiving that he does perceive." John Locke, *An Essay Concerning Human Understanding* (London: T Longman, B Law and Son, 1793) at 333.
[504] Locke's approach to personality might support the AI personality claim, given that AI will be able to express consciousness.
[505] Radin, *supra* note 492 at 963. See also Peter F Strawson, *Individuals: An essay in descriptive metaphysics* (London: Routledge, 2002) at 87-116.
[506] Radin, *ibid*. Bernard Williams, *Moral Luck: Philosophical Papers, 1973-1980* (New York: Cambridge University Press, 1981) at 1-19.

character."[507]

Other philosophical conceptions of persons exist beyond these four categories. David Hume, for example, believes that "the rest of mankind […] are nothing but a bundle or collection of different perceptions, which succeed each other with an inconceivable rapidity, and are in a perpetual flux and movement."[508] For Hume, "the feeling of self-identity over time is merely a persistent illusion."[509]

IP rights under the private property theory can be justified on the basis that a creator is entitled to the rights in his creations – "manifestations of one's personality in one's intellectual expression" – so protection acts "as barriers to expropriation of inalienable features of one's personality."[510] Locke wrote that "every man has a property in his own person";[511] hence, property should be protected *because* it is part of the individual personality. Radin distinguishes two levels of property: (1) market value (fungible); and, (2) personal (inalienable). Radin argues that the latter is more important to protect since it is irreplaceable by other market-bought goods.[512]

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[507] Radin, *ibid* at 964.

[508] *Ibid*. Hume explains: "Our eyes cannot turn in their sockets without varying our perceptions. Our thought is still more variable than our sight; and all our other senses and faculties contribute to this change; nor is there any single power of the soul, which remains unalterably the same, perhaps for one moment. The mind is a kind of theatre, where several perceptions successively make their appearance; pass, re-pass, glide away, and mingle in an infinite variety of postures and situations. There is properly no *simplicity* in it at one time, nor *identity* in different; whatever natural propension we may have to imagine that simplicity and identity." David Hume, L A Selby-Bigge, ed, *Treatise of Human Nature* (Oxford: Clarendon Press, 1896) at 252-3.

[509] Radin, *supra* note 492 at 964-5. Radin explains that behavioral psychologists "might say that the self is nothing separate from the body's processes and activity in the environment … a positive economist might conceive of a person as nothing but a bundle or collection of tastes and desires, conventionally recognised as a unit." Non-behaviorists might consider a person as a self – "a subject to mental states". On the other hand, a communitarian would reject all concepts of personhood, since those concepts derived "from the individualistic worldview that flowered in western society with the industrial revolution. In a society in which the only human entity recognised in social intercourse is some aggregate like the family or clan, there could not be such intense philosophical attention to the biological individual and its ontological, psychological, moral and political status." Persons, according to the communitarian "are embedded in language, history, and culture, which are social creations; there can be no such thing as a person without society."

[510] Zemer, On the Value of Copyright Theory, *supra* note 418 at 64.

[511] Locke, *supra* note 258 at 134.

[512] Radin, *supra* note 492 at 986. Radin explains that "the personhood perspective generates a hierarchy of entitlements: The more closely connected with personhood, the stronger the entitlement."

This approach to IP theory has its critics. In transposing Nozick's classic query, Hughes suggested, "[W]hy should we think putting our personality out into the world gives us rights to the things we create? Why should we not assume that when we mix our personality with the world, we lose part of our personality instead of gaining part of the world?"[513]

2.2.2.4 The Social Planning Theory

Social planning – or proprietarian[514] – theory contends that property rights should be allocated in a way that would promote desirable societal goals.[515] Or, according to broader interpretations (like Zemer's), social planning is "largely devoted to discussing ways to maintain a strong civic culture that benefits from a reasonably balanced social and institutional intellectual property regime."[516]

This theory – inspired by philosophers such as Thomas Jefferson,[517] Karl Marx,[518] James Harrington,[519] Morris Cohen and others[520] – supports looser IP restrictions to maximize social and

[513] Justin Hughes, "The Personality Interest of Artists and Inventors in Intellectual Property" (1998) 16 Cardozo Arts & Ent LJ 81 at 84-5.
[514] Greg Alexander suggested the term Proprietarian theory. See Greg S Alexander, *Commodity and Propriety: Competing Visions of Property in American Legal Thought, 1776–1970* (Chicago: University of Chicago Press, 1997).
[515] Fisher, *supra* note 407 at 172.
[516] Zemer, On the Value of Copyright Theory, *supra* note 418 at 65.
[517] Thomas Jefferson, *Notes on the State of Virginia* (Norton, 1972).
[518] Karl Marx, *Economic and Philosophic Manuscripts of 1844* (International Publishers, 1964).
[519] James Harrington, *Oceana* (Hyperion Press, 1979).
[520] Morris R Cohen, "Property & Sovereignty" (1927) 13:1 Cornell Law Q 8; Frank Michelman, "Law's Republic" (1988) 97:8 Yale L J 1493; William Fisher, Morton J Horwitz & Thomas A Reed, eds, *American Legal Realism* (Oxford: Oxford University Press, 1993).

cultural engagement.[521] Among the many eminent scholars developing this approach include Fisher,[522] Neil Netanel,[523] Rosemary Coombe,[524] Niva Elkin-Koren,[525] and Zemer.[526]

Netanel explores the balance between owner rights and the public domain,[527] proposing an alternative approach: the "democratic paradigm". Netanel argues that copyright enhances our society's democratic character using a free market,[528] by providing sufficient incentives to support creation without government or elite patronage.[529] In other words, Netanel claims that copyright's objective is democratic culture, not efficient authorship (an objective that constrains robust culture;[530] though autonomous self-reliant authorship remains an admittedly essential copyright objective for Netanel).[531] The democratic approach approves of transformative use – thus disapproving of authorial control over derivation – which in turn "loosen media conglomerates' hold on public discourse."[532] An ideal democratic culture is one that maximizes mass expression opportunities while maintaining incentives to express without state intervention.[533] One way to do

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[521] Zemer, On the Value of Copyright Theory, *supra* note 418 at 66.
[522] William Fisher, "Reconstructing the Fair Use Doctrine" (1988) 101 Harv L Rev 1659.
[523] Neil W Netanel, "Copyright and a Democratic Civil Society" (1996) 106 Yale L J 283.
[524] Rosemary J Coombe, "Objects of Property and Subjects of Politics: Intellectual Property Laws and Democratic Dialogue" (1991) 69 Tex L Rev 1853 [Coombe, Objects of Property]. Zemer further explains that "[b]oth Coombe and Netanel advocate a greater democratic dialogue, a freer communicative sphere, the need to eliminate restrictions on creative expression, a stronger public domain and a radical change of the perception of copyright proprietary entitlements in order to enable more widespread participation in the production of knowledge and idea." Zemer, On the Value of Copyright Theory, *supra* note 418 at 66.
[525] Niva Elkin-Koren, "Copyright Law and Social Dialogue on the Information Superhighway: The Case Against Copyright Liability of Bulletin Board Operators" (1995) 13 Cardozo Arts & Ent LJ 345; Niva Elkin-Koren & Eli M Salzberger, *supra* note 462.
[526] Zemer, On the Value of Copyright Theory, *supra* note 418 at 65; Lior Zemer, *The Idea of Authorship in Copyright* (Ashgate Publishing, 2007) [Zemer, *The Idea of Authorship*].
[527] Netanel, *supra* note 523 at 285.
[528] *Ibid* at 288.
[529] *Ibid* and at 347-362.
[530] *Ibid* at 288.
[531] Roland Barthes, "The Death of the Author" in *Image Music Text*, Stephen Heath, trans (Farrar, Straus and Giroux, 1978).
[532] Netanel, *supra* note 523 at 362.
[533] *Ibid* at 363.

this, per Netanel, is through compulsory IP licensing regimes "to balance the interests of artists and 'consumers' of their works."[534]

Social planning theory is skeptical of lengthy IP terms. Terms should instead be designed with the importance of the works' social value in mind, maximizing the public domain and minimizing IP owner surplus.[535] Netanel recommends two ways – tied to terms – to achieve this goal. First, extending protection for personal uses to digital copies under certain conditions;[536] and, second, eliminating rigorous technological protection measures that restrict unauthorised users from access to electronic databases and content.[537] The democratic approach seeks to discourage IP owners and providers from controlling works already publicly available or licensed to an individual consumer or user for his private use.[538]

Netanel suggests a copyright regime that fosters democratic values as follows: First, "[t]he copyright term should be shortened, thereby increasing the size of the 'public domain' available for creative manipulation." Second, derivative works (or transformative users) should be exempt from copyright owners' grips. Finally, "compulsory licensing systems should be employed more frequently to balance the interests of artists and 'consumers' of their works."[539]

[534] Fisher, *supra* note 407 at 173.
[535] Netanel, *supra* note 523 at 369. Netanel states that the current length of copyright protection provides by all accounts "more than sufficient support for an independent and diverse sector of authors and publishers, and that, from the perspective of democratic governance, any further lengthening of the duration of protection would be undesirable and unwarranted."
[536] *Ibid* at 373: "That extension would constitute a *substitute* for copyright owner rights that will have a far diminished utility in the digital market and not an onerous expansion of copyright's scope." Netanel, for example, is skeptical in regard to neo-classicist embrace of collective licensing organizations.
[537] *Ibid* at 382. It is worth mentioning Canada's persistence in recognizing TPM, per the recent Federal Court case *Nintendo of America Inc v King*, 2017 FC 246 (CanLII).
[538] Netanel, *ibid* at 385.
[539] Fisher, *supra* note 407 at 173.

Rosemary Coombe – taking a dialogic approach to social planning IP theory[540] – advocates for an open and safer public area for creation.[541] Coombe argues that strong (and expensive) IP rights threaten the cultural process, because they prevent the public "from using the most powerful, prevalent, and accessible cultural forms to express identity, community, and difference."[542] Coombe's interpretation of social planning rejects the "rationalist privileging of the autonomous self and its claims to know an objective social world."[543] She instead shares modernist aspirations to "de-center the subject and its claims to ontological and epistemological primacy" but rejects the insistence that "a single underlying structure may be privileged as the objective reality underlying the cultural epiphenomena of everyday life and consciousness."[544] Coombe believes that the conventional forms of discourse limit our realities.

Coombe's argument is built upon the scholarly debate that "the objective world is the cultural construction of social subjects and that subjectivity itself is a product of language and cultural practice."[545] As Coombe explains, "What we experience as social reality is a constellation of cultural structures that we ourselves construct and transform in ongoing practice."[546]

Merges criticizes Coombe's and Netanel's views that the Lockean proviso is impossible to apply to dialogic culture.[547] Merges prefers a different balance, stating that "[w]e cannot escape

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[540] Coombe referring to the concept of dialogism as developed by the philosophers Mikhail Bakhtin and Martin Buber and by the physicist David Bohm. See Mikhail Bakhtin, *The Dialogic Imagination: Four Essays*, Michael Holquist, ed, Caryl Emerson & Michael Holquist, trans (University of Texas Press, 1981); Maurice Friedman, "Martin Buber and Mikhail Bakhtin: The Dialogue of Voices and the Word that is Spoken" in Bela H Banathy & Patrick M Jenlink, eds, *Dialogue as a Means of Collective Communication* (New York: Springer Science & Business Media, Inc, 2006) at 29; Zemer, Dialogical Transactions, *supra* note 437.
[541] See e.g. Rosemary J Coombe, *The Cultural Life of Intellectual Properties: Authorship, Appropriation and the Law* (Duke University Press, 1998).
[542] Coombe, Objects of Property, *supra* note 524 at 1855.
[543] *Ibid* at 1855-6.
[544] *Ibid* at 1856.
[545] *Ibid* at 1858.
[546] *Ibid*.
[547] Merges, Locke Remixed, *supra* note 473 at 1266: "Professor Rosemary Coombe, for example, has written of the 'dialogic' way in which culture is constructed; she has focused on the 'drive to meaning' engaged in by all people,

the barrage of images, signs, and symbols that flood our minds from the ubiquitous mass media, yet we are supposed to honor property lines, and remain passive consumers of, instead of active participants in, the media saturated culture that engulfs us."[548] According to Merges, we ought to limit "how much someone may be permitted to comment on, reconfigure, and 'make their own' the works of the mass media."[549] Of course, this is demonstrably untrue for communities who deliberately exclude TV and Internet from their lives; for them, popular culture and media are indeed escapable.[550]

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which she believes requires legal rules that permit widespread commentary, critique, and reaction to previously published works. She sees expansive IP rights as a threat to these important values. She and others writing from this strong public domain position have pointed out that the dialogic nature of culture makes it impossible in many cases for IP rights to satisfy the Lockean sufficiency proviso."

548 *Ibid*.

549 Merges, Locke Remixed, *supra* note 473 at 1267.

550 *Ibid* at 1268: "All I mean to say is that, regardless of the intensity of the pleasure or comfort one derives from consuming mass media, it is not after all an essential activity in a deep sense. Exposure to Big Media is a choice. It is a widely shared choice, it is a very easy choice, it is a highly popular choice, but it is still a choice."

2.2.3 *Moral Rights*[551]

Moral rights protect an author's non-economic interests,[552] which generally mean personal interests like honour, reputation, and dignity.[553] The doctrine emerged in Europe in the nineteenth century;[554] French civil law is considered most sympathetic to it.[555] In each country that recognizes moral rights, "the nuances of interpretation reflect the unique qualities of its culture."[556] Continental Europe's civil law countries favour strong moral rights copyright laws.[557] The apparent reason they differ from common law systems is found in the individual rights and personhood doctrines of civil law countries in contrast to the commercial orientation of common law countries.[558] Common law jurisdictions only adopted moral rights more recently.[559]

Moral rights usually last the full duration of the copyright term,[560] regardless of any

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[551] Vaver clarifies that the translation of the phrase to English was not accurate: "Since the word 'moral' is commonly contrasted with 'legal', one's first reaction to a 'moral right' is that it is something to which one has no *legal* entitlement – only a moral or … deontological entitlement." David Vaver, "Moral Rights Yesterday, Today and Tomorrow" (1999) 7(3*)* Intl JL & IT 270 at 271-2 [Vaver, Moral Rights Yesterday].

[552] Bently & Sherman, *supra* note 406 at 272; Jane Ginsburg, "Moral Rights in a Common Law System" (1990) 1 Ent L Rev 121; Mira T Sundara Rajan, *Moral Rights: Principles, Practice and New Technology* (New York: Oxford University Press, 2011) at 4.

[553] Kwall, The Soul of Creativity, *supra* note 440 at 39; Vaver, *supra* note 237 at 203. See also Vaver, Moral Rights Yesterday, *supra* note 551.

[554] Vaver, Moral Rights Yesterday, *ibid* at 271. Kwall argues that although the moral rights doctrine was developed in a later stage, the roots for the doctrine were conceived "[as] early as the sixteenth and seventeenth centuries, in England, France and elsewhere." Kwall, The Soul of Creativity, *ibid* at 39.

[555] French law has adopted Hegel dualist theory (the author's creations are protected by a different set of rights – personal and economic). The French legal system views moral rights as the author's personal interest and his authorial dignity. However, "Prior to the emergence of moral rights, the view of copyright around the time of the French Revolution was substantially similar to Anglo-American perspective." Kwall, The Soul of Creativity, *supra* note 440 at 39 (Kwall distinguishes between the dualist and monist theories). German law moral right concept is derived from the philosophy of Kant and Otto Friedrich von Gierke and shares a monist approach to moral rights (author's creations represent complete embodiment of the author's self). See e.g. Neil Netanel, "Copyright Alienability Restrictions and the Enhancement of Author Autonomy: A Normative Evaluation" (1993) 24 Rutgers LJ 347 at 374-382; Immanuel Kant, *The Philosophy of Law*, William Hastie, trans (T & T Clark, 1887).

[556] Sundara Rajan, *supra* note 552 at 5.

[557] Kwall, The Soul of Creativity, *supra* note 440 at 38, clarifies that "[h]istorically, there has been a divergence in moral rights protection between the civil and common law traditions, although recently the majority of common law jurisdictions have enacted moral rights protections to some degree."

[558] Sundara Rajan, *supra* note 552 at 11.

[559] Kwall, The Soul of Creativity, *supra* note 440 at 47. Canada adopted moral rights in 1931, the UK in 1988, New Zealand in 1994, Australia in 2000, and Ireland in 2001.

[560] This is not true in all countries. In France, for example, moral rights are protected indefinitely. See Sundara Rajan, *supra* note 552 at 15.

economic rights diverted from the work.[561] The author's interest in the work "transcends the motive of financial gain."[562] Hence, even if the author sells or licenses his work, he retains his moral rights.[563] What's more, as Vaver notes: "Parting with the copyright does not lessen the author's personal attachment to the work. It follows that the author should have recourse against those who present the work differently from the way the author originally intended."[564]

Moral rights are internationally recognized in Article 6bis of the *Berne Convention for the Protection of Literary and Artistic Works*, which states:[565]

> *"[T]he author shall have the right to claim authorship of the work and to object to any distortion, mutilation or other modification of, or other derogatory action in relation to, the said work, which would be prejudicial to his honour or reputation*."

Berne confirms that moral rights are independent and persist even after an economic right's transfer. Gerald Dworkin opines that *Berne* – in its historical context – reflects a compromise by common law countries which were "caught by surprise when moral rights issues surfaced during the conference."[566] The more recent agreement on *Trade-Related Aspects of Intellectual Property*

[561] Vaver, Moral Rights Yesterday, *supra* note 551 at 270-1.
[562] Sundara Rajan, *supra* note 552 at 4.
[563] In many common law countries an author can, under contract law, waive his moral rights – in part or as a whole – by agreement. In a world where the relations between the parties are not equal, waivers might undermine the moral rights theory: "[C]ountries like Canada and the United Kingdom have seen the development of standard-form contracts in which complete waivers of moral rights are required before any publication activity will be undertaken." Sundara Rajan, *supra* note 552 at 17.
[564] Vaver, Moral Rights Yesterday, *supra* note 551 at 271.
[565] *Berne Convention for the Protection of Literary and Artistic Works*, 1886, 828 UNTS 221 [*Berne*]. Vaver, *supra* note 237 at 204. The US and Russia were the last to sign the convention in 1989 and 1995, respectively. Today every country is required to protect moral rights according to the *Berne* standard at minimum. Sundara Rajan further explains: "Article 6bis originally represented an uneven compromise between civilian and common law views that clearly favored the European position on moral rights. The article was subsequently amended … [and] the current version … retains the original focus of the law on the two moral rights of attribution and integrity." Sundara Rajan, *supra* note 552 at 12.
[566] Gerald Dworkin, "The Moral Right of the Author: Moral Rights and the Common Law Countries" (1995) 19 Colum.-VLA J L & Arts 229 at 231.

Rights (*TRIP*s)[567] requires that member states adhere to the substantive provisions of *Berne*.[568] However, Article 9(1) of *TRIP*s excludes moral rights entirely from *TRIP*s, stating that "[m]embers shall not have rights or obligations under this Agreement in respect of the rights conferred under Article 6bis of that Convention or of the rights derived therefrom."[569]

The World Intellectual Property Organisation (WIPO) approaches moral rights differently by establishing a moral right for performance in Article 5 of the *WIPO Performance and Phonograms Treaty*,[570] granting rights of attribution and integrity for performers.[571] Mira Sundara Rajan emphasizes that a notable difference between *Berne* and the *WPPT* – also considered significant by Mihály Ficsor – is "the elimination of the word "honor" from the definition of the performer's right of integrity."[572] According to Kwall, *WPPT*'s Article 5 and *Berne*'s Article 6bis are the only existing international moral protections.[573]

Regardless of jurisdiction, two moral rights are always recognized and accepted in these international agreements: the right of attribution and the right of integrity. In civil law systems with a strong moral rights basis, other rights can be recognized as well, such as withdrawal and disclosure rights.[574]

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567 *Agreement on Trade Related Aspects of Intellectual Property Rights*, 1869 UNTS 299, 33 ILM 1197.
568 *TRIP*s, *ibid*; Sundara Rajan, *supra* note 552 at 13.
569 *TRIP*s, *ibid*.
570 *WIPO Performances and Phonograms Treaty*, 20 December 1996, 36 ILM 76 [WPPT].
571 See also Kwall, The Soul of Creativity, *supra* note 440 at 38.
572 Sundara Rajan, *supra* note 552 at 13.
573 Kwall, The Soul of Creativity, *supra* note 440 at 38, explains that "on the international level the only existing protections for moral rights are Article 6bis of Berne for authors of works and the WPPT provision for performers."
574 *Ibid* at 44; Cyrill P Rigamonti, "Deconstructing Moral Rights" (2006) 47:2 Harv Int'l LJ 353 at 356. Rigamonti explains that the right of disclosure is "the right to decide when and how the work in question will be published" and the right of withdrawal is "the right to withdraw a work after publication." Kwall suggests that "[u]nderlying the right of disclosure is the idea that the author, as the sole judge of when a work is ready for public dissemination, is the only one who can possess any right in an uncompleted work." The right of withdrawal is recognised in Germany and France, and only rarely exercised since "the author must affirmatively show severe harm" and the right is "applicable only to published works rather than works of visual art." Moreover, with the exception (partially) of Swiss (which requires the owner to offer the author to buy his work), most countries do not protect the author from the destruction of his creation.

The attribution right requires that an author's name is properly and consistently associated with his work.[575] As a result, attribution preserves the historical truth.[576] Accordingly, the author retains the right to seek relief if his work is unattributed or falsely attributed to another.[577] The integrity right prohibits distortion, mutilation, or modification of a work.[578] Considered the most important moral right,[579] it preserves "cultural heritage, whether material or intangible, from damage."[580] Integrity can apply both to physical or contextual modifications (adding Christmas ribbons to a goose sculpture), and in some cases, where a work is associated with a product, service, cause or institution (use in a political party's rallies).[581]

Moral rights have limits, even where their protection is strongest. Attribution, for example, does not necessarily "entitle the anonymous or pseudonymous author to prevent a third party from disclosing the author's real name" and thus might extend copyright term.[582] Integrity is a narrowed right in Germany and France. Germany protects only gross distortions or mutilations of films and works included in films; France, meanwhile, excludes moral rights protection for computer programs, architectural works and creations of "minimal originality".[583]

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[575] Sundara Rajan, *supra* note 552 at 5.
[576] *Ibid*.
[577] Rigamonti, *supra* note 574 at 363. Rigamonti further argues, at 364, that "[i]n addition to the right to claim authorship, authors also have a right *not* to claim authorship in the sense that they may elect to remain anonymous or to use pseudonyms instead of using their real names."
[578] *Berne*, *supra* note 565 at Art. 6bis (1).
[579] Rigamonti, *supra* note 574 at 364.
[580] *Ibid*; Kwall, The Soul of Creativity, *supra* note 440 at 42, states that "although Berne and other countries require that actionable modifications must negatively impact the author's honor or reputation, some countries such as France and Germany do not explicitly incorporate this caveat."
[581] Kwall, The Soul of Creativity, *ibid* at 43; Physical: *Snow v The Eaton Centre Ltd* (1982), 70 CPR (2d) 105 (CA) (The Ontario Superior Court ruled against Toronto Eaton Centre for violating Michael Snow's moral rights in his work); Contextual: *Prise de Parole Inc. c. Guérin, Éditeur Ltée*; *Association*, [1995] FCJ No 1583 (ABBA's 2010 lawsuit against the Danish People's Party).
[582] Rigamonti, *supra* note 574 at 364.
[583] Kwall, The Soul of Creativity, *supra* note 440 at 42-3. Rigamonti, *ibid* at 364-5, further provides that "[i]n France, the scope of the right of integrity is reduced to the mere protection of the author's honor and reputation if the work is a computer program. In Germany, a separate statutory regime was established for motion pictures and for works used in the production of motion Pictures." In that regard it is interesting to address the "special condition" of commuter programs moral rights in France, as Kwall, *ibid* at 183, footnote 55 explains: "In France, an author is precluded from

Tension between contract and copyright law makes moral rights waivers a controversial practice.[584] This is because moral rights are understood as not transferable, which opposes freedom of contracts doctrine.[585] In common-law countries, however, moral rights are routinely waived in contracts.[586] This tension is exacerbated by the often variable, sometimes perpetual idea of moral rights duration. While *Berne* prescribes a minimum standard duration lasting a period equal to the work's economic rights,[587] French moral rights last forever.[588]

More tension arises in the way different jurisdictions define authorship (*i.e.*, who is the beneficiary of moral rights).[589] In Canada, for example, 2012's *Copyright Modernization Act* expanded moral rights protection for performers.[590] The UK's *Copyright and Patents Act 1988*

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preventing any 'adaptation of a computer program' that complies with rights transferred and from 'exercising his right to retract or correct' … French law also precludes authors of computer programs from opposing modifications unless they are prejudicial to their honor or reputation."

[584] This statement is not completely accurate. In Canada, the *Copyright Act*, RSC 1985, c C-42 [*Copyright Act*, RSC 1985], s 14.1(2), explicitly allows waivers.

[585] Rigamonti, *supra* note 574 at 376; Kwall, The Soul of Creativity, *supra* note 440 at 46, discusses the unique situation of "ghostwriters". According to Kwall, "[With] respect to waiver-related issues in connection with the right of attribution in the civil law tradition, authors generally 'always preserve their right to disclose the fact of their authorship, even if previously agreed to publish their work anonymously or under pseudonym'."

[586] D'Agostino, *supra* note 408 at 18: "[U]nlike many other European countries, but similar to Canada and the US, the UK allows waiver of moral rights by contract or estoppel." However, in the UK "[m]oral rights can be waived in writing but cannot be assigned", *ibid* at 115.

[587] Such model has adopted in Germany and in the UK. See e.g. section 86(1) of the *CDPA* which states: "The rights conferred by section 77 (right to be identified as author or director), section 80 (right to object to derogatory treatment of work) and section 85 (right to privacy of certain photographs and films) continue to subsist so long as copyright subsists in the work." It should be noted that "to object the false attribution is less extensive, lasting for only 20 years after the author's death." Bently & Sherman, *supra* note 406 at 272-3; See also section 86(2) of the *CDPA*, which states that "[t]he right conferred by section 84 (false attribution) continues to subsist until 20 years after a person's death."

[588] Kwall, The Soul of Creativity, *supra* note 440 at 46. Kwall offers the reasons for the French approach: "[i]n France, the author's moral rights always have been regarded as a separate body of protection, rather as a doctrine that is intertwined with the creator's pecuniary rights." *Ibid* at 46-7.

[589] *Ibid* at 11, addressed this question in the second chapter of her book: "The Intrinsic Dimension of Human Creativity." In doing so, Kwall is using a wide range of sources in her aspiration to search for the concept of human creativity.

[590] SC 2012, c 20 [Copyright Modernization Act], amending Canada *Copyright Act*, RSC 1985, *supra* note 590; Kwall, The Soul of Creativity, *supra* note 440 at 47; Vaver, *supra* note 237 at 203, refers to Bill C-32, which is an early attempted to amend the *Copyright Act*, RSC 1985. The amendments were designed to reflect the "[w]orld Intellectual Property Organization Copyright Treaty and the World Intellectual Property Organization Performances and Phonograms Treaty, adopted in Geneva in 1996." *Copyright Modernization Act*, *ibid* at the preamble. The current *Copyright Act*, RSC 1985 defines moral rights as "the rights described in subsections 14.1(1) and 17.1(1)." Subsection 17.1 provides that "(1) In the cases referred to in subsections 15(2.1) and (2.2), a performer of a live aural performance or a performance fixed in a sound recording has, subject to subsection 28.2(1), the right to the integrity of the

(*CDPA*) explicitly excludes computer programs as "authors" of computer-generated works, instead designating copyright to the human "by whom the arrangements necessary for the creation of the work are undertaken."[591] The *CDPA* further disallows any right of attribution or integrity for computer programs or generated creations[592] and diminishes employees' moral rights protection.[593]

During the discussion leading to the *CDPA* copyright reform in 1988, Lord Beaverbrook expressed doubts about the applicability of moral rights to UK computer-generated works protection. Since moral rights are concerned "with the personal nature of creative effort", Lord Beaverbrook argued that the person "whom the arrangements necessary for the creation of a computer-generated work are undertaken will not himself have made any personal, creative effort."[594]

Citing this quotation, Andrés Guadamuz concluded that the UK copyright law "recognises that there is no creative input in computer-generated works, and therefore s 9(3) has been framed as an exception to the creativity and originality requirements for the subsistence of copyright. It is precisely this divorce with creativity what makes the UK's computer-generated clause so different from other jurisdictions."[595]

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performance, and — in connection with an act mentioned in subsection 15(1.1) or one for which the performer has a right to remuneration under section 19 — the right, if it is reasonable in the circumstances, to be associated with the performance as its performer by name or under a pseudonym and the right to remain anonymous."

[591] *CDPA*, s 9(3).

[592] Bently & Sherman, *supra* note 406 at 276 (the right of attribution), at 283 (the right of integrity). The *CDPA* provides that the right of attribution "does not apply in relation to the following descriptions of work— (a) a computer program; (b) the design of a typeface; (c) any computer-generated work." *CDPA*, s 79(2). In regard to the right of integrity the *CDPA* states explicitly that "[t]he right does not apply to a computer program or to any computer-generated work." *CDPA*, s 81(2).

[593] Kwall, The Soul of Creativity, *supra* note 440 at 48; Bently & Sherman, *ibid* at 273-4, 279 and 289. Accordingly, "[I]f the employer or copyright owner authorized reproduction … of the work the right [of attribution] does not apply" and "the right of integrity does not apply to anything done by or with the authority of the copyright owner … [t]he general rule … is that an employer can deal publicly with derogatory treatments of an employee's work."

[594] Guadamuz, *supra* note 422 at 176; UK, HL Deb (25 February 1988), vol 493, col 1305.

[595] *Ibid*.

Moral rights face criticism. The romantic author ideal underlying the personal bond between creator and creation has notable weaknesses.[596] Their continental origin may be less compatible for (or incompatible with) common law copyright regimes.[597] Moral rights impede free markets through contractual restrictions and preservation of several aspects of the author's rights.[598] They promote private ownership and interests over the public,[599] and increase potential free expression conflicts, as in Guy Pessach's example of authors exploiting their integrity rights "to prevent publication of a parody of their work."[600] Public interests and creative tastes change over time, and, as Amy Adler notes, "Amidst the uncertainty, one can argue that it is sometimes in the public interest to mutilate a work rather than to preserve it."[601]

On the other hand, using moral rights might help regulate modern technology and improve the quality of information proliferation. Sundara Rajan,[602] concerned that knowledge democratization, coupled with effective manipulation and alteration technology, may degrade information beyond recognition.[603] In her view: [604]

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[596] Bently & Sherman, *supra* note 406. This notion of the romantic author does not recognize the collaborative nature of the creative process, as discussed earlier and as reflected in the writings of scholars such as Coombe, Drassinower and Zemer.
[597] *Ibid* at 274.
[598] Dworkin, *supra* note 566 at 242-3: "Whether or not the reluctance of those in common law jurisdictions to legislate expressly for moral rights laws is based upon real or false fears is debatable. It is certainly true, though, that a deeply rooted suspicion of such legislation existed and continues to exist."
[599] Bently & Sherman, *supra* note 406 at 274.
[600] Guy Pessach, "The Author Moral Right of Integrity in Cyberspace: A Preliminary Normative Framework" (2003) 34 IIC 250.
[601] Amy M Adler, "Against Moral Rights" (2009) 97 Cal L Rev 263 at 281.
[602] Sundara Rajan, *supra* note 552 at 2.
[603] *Ibid* at 4.
[604] *Ibid*.

> *"[C]opyright rules play into both sides of the equation. They represent a method of generating economic value from knowledge by imposing legal restrictions on its circulation where few limitations exist in practice. By restricting the unauthorized dissemination of works, copyright may also help, indirectly, to promote the integrity of the knowledge."*

Copyright's commercial function, in partnership with its moral rights function, might therefore support improved knowledge integrity.[605]

[605] *Ibid*.

2.3 PLACING AI WITHIN THE IP LAW MAP

In chapters I and II, I mapped, summarized, compared and contrasted IP's predominant theories. In doing so, I indicated unique differences and commonalities between each approach. In chapter III, I will place AI within the IP law map, and describe IP protection for three different AI development levels:[606]

A. The current pre-AI stage;

B. The impending stage of AI realization; and

C. The future stages of advancement.[607]

Determining the best approach to protecting AI-IP may be helped by exploring how developments in computer software considerably transformed IP protection over the years. The law's interaction with the onset of computer software – a field directly contributing to AI technology, and from which AI technology has largely extended – should be particularly illuminating for AI-IP modelling.

Current developments may also highlight differences between computer-assisted and computer-generated programs. I consider these recent IP law software-related developments because such law may affect software assisted or generated by computers in profoundly different ways.

[606] It is important to distinguish between the current stage of AI (hence – not necessarily an "AI" according to scientific standards), the next stage of AI evolution, and future possible advancements.
[607] Later, in chapter IV, I will explore each IP theory's applicability to AI's developments and consider how IP theories might adhere to rights allocation for AI creations.

Finally, as noted in Part I,[608] the scientific community overwhelmingly recognizes a possibility of singularity – AI reaching human-level intelligence – occurring by the years 2040-50 (not to mention an accepted higher probability that AI exceeds human intelligence in the following years).

In this chapter, I aspire to develop ideas and to shatter some current misconceptions. My discussion aims to expand on the ideas of Lemley, Menell, and others, as well as contribute to an ongoing debate at the intersection of IP law and technology.

2.3.1 The Past: IP Law Trends for Software Protection

2.3.1.1 Protecting Software through Copyrighting Literary Code

Computer programs and copyright protection have never been considered a good match – "[a]fter all, copyright is intended, at base, to protect creative expression, such as paintings, music, novels, and sculptures."[609] Vaver further observes that "copyright protection for programs is awkward and causes many practical problems. Programmers enjoy being called 'binary bards,' and the codes they produce may look like telegraph code books."[610] Software is usually considered more functional than it is artistic.[611] Thus, it lacks several important "ingredients" to garner copyright protection.

[608] Part I, *Searching for Common Ground: Conceptualizing AI*, chapter II – The singularity is near.
[609] Lothar Determann & David Nimmer, "Software Copyright's Oracle from the Cloud" (2015) 30 BTLJ 161 at 165. Paul Edward Geller, opines that "computer programs represent one of a number of hybrid creatures that the law of intellectual property has not yet fully tamed." Paul Edward Geller, "International Copyright: The Introduction" in Lionel Bently, Paul Edward Geller & Melville B Nimmer, eds, *International Copyright Law and Practice* (Lexis Nexis, 2016) at § 4[1][c][i][B].
[610] Vaver, *supra* note 237 at 70-1.
[611] This statement is not always true. Programming a code might prove to be an artistic and innovative process. It seems that this perception is more relevant to "old" codes and not to current codes and developments.

At the first stages of computer software development (1960s and 1970s),[612] IP law (at least in the US) did not protect software.[613] Interestingly, as Determann and Nimmer,[614] and Menell[615] noted, when IP law stepped in, copyright – not patent law – become the "legal vehicle providing the primary source of intellectual property law protection for software" and thus programming.[616] Evidently, as Yochai Benkler concludes, "Throughout most of its history, software has been protected primarily by copyright, if at all."[617]

A computer program is typically classified as a literary work,[618] but it is crucial to note that, as Judge Learned Hand explains, "the right cannot be limited literally to the text; else a plagiarist would escape by immaterial variations."[619] The same principle should apply to software,

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[612] Menell describes the development of the modern computer and provides an overview of computer processing history. Menell explains that the invention of the transistor in the late 1940s contributed to the expansion of computers' capabilities, and "[b]y the early 1960s, advances in electronics technology enabled computer firms to manufacture minicomputers. Further advances in electronics, in particular the development of low-cost integrated circuits, have made micro (or personal) computers possible." Peter S Menell, "Tailoring Legal Protection for Computer Software" (1987) 39 Stan L Rev 1329 at 1332-4 [Menell, Tailoring Legal Protection for Computer Software].

[613] This approach has led developers and vendors to seek the protection of other legal fields such as contract law and trade secrets. Mark A Lemley, "Convergence in the Law of Software Copyright?" (1995) 10 BTLJ 1 at 3 [Lemley, Convergence in the Law of Software Copyright?].

[614] Determann & Nimmer, *supra* note 609.

[615] Menell, Tailoring Legal Protection for Computer Software, *supra* note 612 at 1354.

[616] Determann & Nimmer, *supra* note 609. Menell, *ibid* at 1337-8, provided the reasoning for copyright protection for computer programs: "First, enhancing the scope of intellectual property protection … increases the expected reward to the creator by enhancing the opportunity for monopolistic exploitation of any works created. Second, increased rewards encourage inventive activity. Moreover, the disclosure of new discoveries that is encouraged by protection further spurs inventive activity. Third, greater investment in inventive activity results in the discovery of more ideas and faster advancement of technology, thereby increasing the range of products and reducing the cost of products to society."

[617] Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (New Haven: Yale University Press, 2006) at 437.

[618] Australia's *Copyright Act 1968* provides that literary work includes, under section 10(1), "a computer program or compilation of computer program", *International Copyright Law and Practice*, *supra* note 609 at AUS-19 § 2[2][a][i]. See also AUS-28 § 2[4][d] describing the development of copyright protection for computer programs. India amended the *Copyright Act* in 1984 clarifying that "computer programs fall within the definition which section 2(o) of the Act sets out of the inclusive term 'literary work'." *Ibid* at IND-17 § 2[4][e][d]. In France, the 1985 amendment to the *Copyright Act* includes software as a protected work. However, "[t]he law does not distinguish between programs expressed in source code, that is, in a language in which programmers work, and programs formulated in object code, which is addressed only to machines." *Ibid* at FRA-38-39, § 2[4][d].

[619] *Nichols v Universal Pictures Corp*, 45 F (2d) 119 at 121 (2d Cir 1930).

thus protecting more than mere code.[620]

i. Between the 1970s and 1980s, the US Defined "Computer Programs" as Literary Copyright Works, and Courts Interpreted Their Fixation.

The National Commission on New Technological Uses of Copyright Works (CONTU) report represented a significant milestone in establishing the software-protecting copyright regime in the US.[621] US Congress established CONTU in 1974, following developments in computer science. CONTU's mission was to advise Congress "to revise comprehensively the copyright laws of the United States."[622] After years of deliberation, navigating the complex issues raised by computer science advancements, CONTU concluded that computer programs, "to the extent that they embody an author's original expression", constitute expression and should be accorded the same rights as other expressive works.[623]

CONTU also argued that computers are no more than tools, and "that there was no reasonable basis for concluding that a computer in any way contributes authorship to a work produced through its use."[624] Following CONTU's report,[625] Congress amended US Code's Title

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[620] Lemley concluded: "Indeed, protection for copyrighted works extends beyond even the language or particular creative expression used, to encompass the 'structure, sequence and organization' of a work, and its 'total concept and feel'." Lemley, Convergence in the Law of Software Copyright?, *supra* note 613 at 5.

[621] US, National Commission on New Technological Uses of Copyright Works, *Final Report of the National Commission on New Technological Uses of Copyright Works* (Washington, DC: Library of Congress, 1979), online: <digital-law-online.info/CONTU>. Miller, CONTU's Commissioner, explains what led to CONTU: "[A]ll concerned, including Congress, decided to avoid grappling with technological issues that obviously required more study than the legislative process was then willing to give them. Thus, the 1976 *Copyright Act* froze the law on a variety of issues and left responsibility for exploring and formulating policy regarding the intersection of copyrights and computers to [CONTU], which had been created in 1974 in anticipation of the legislative moratorium." See Miller, *supra* note 59 at 979.

[622] CONTU, *supra* note 621 at 1.

[623] *Ibid*; Miller, *supra* note 59 at 982-3. See also the Canadian report on computer programs: A A Keyes & C Brunet, "Copyright in Canada: Proposals for a Revision of the Law" (1977) 7:4 Performing Arts Rev 459. Vaver, *supra* note 237 at 71, further explains: "The definition of computer program should include source and object codes for operating and application programs, macros, component, routines such as a table numbers operating as a program lock, and the screen display generated the program … [t]he program's concepts and ideas, however, have no copyright."

[624] Annemarie Bridy, "The Evolution of Authorship: Work Made by Code" (2016) 39 Colum J L & Arts 395 at 396 [Bridy, The Evolution of Authorship].

[625] CONTU, *supra* note 621.

17 (copyright law) to include the *Computer Software Act of 1980*.[626] This amendment defined a computer program as a "set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result."[627] In 1986 the Congressional Office of Technology Assessment (OTA) criticized CONTU's comparison between computers, typewriters, and cameras by stating that it is misleading to think about programs as tools of creations in the same sense.[628] OTA further suggested developing a new protection framework for computer programs "that would treat functional works as a major, separate class of intellectual property law."[629]

Subsequent caselaw interpreted the 1980's amendment as changing the definition of "computer program". Courts took a practical approach, willing to provide "real" protection for software programs under copyright law, establishing computer programs as both literary and audiovisual works by the mid-1980s.[630]

To begin, the Third Circuit, in *Apple Computer, Inc v Franklin Computer Corp,*[631] found both operating systems and applications were equally copyrightable as computer programs. Affirming *Apple's* decision, the court in *Williams Electronics v Arctic* held that literal elements of

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626 *Copyright Amendment Act of 1980*, Pub L No 96–517, 94 Stat 3015. CONTU, *ibid* at 1.
627 *Copyright Law of the United States*, 17 USC § 101 [*Copyright Law of the United States*]: Definitions – "computer program". Canada *Copyright Act*, RSC 1985, *supra* note 590, s 2, defines a "computer program" in a similar way as " … a set of instructions or statements, expressed, fixed, embodied or stored in any manner, that is to be used directly or indirectly in a computer in order to bring about a specific result."
628 US, US Congress, Office of Technology Assessment, *Intellectual Property Rights in an Age of Electronics and Information* (Washington, DC: US Government Printing office, 1986) at 72 [*Intellectual Property Rights in an Age of Electronics and Information*]: "It is misleading, however, to think of programs as inert tools of creation, in the sense that cameras, typewriters, or any other tools of creation are inert. Moreover, CONTU's comparison of a computer to other instruments of creation begs the question of whether interactive computing employs the computer as cocreator, rather than as an instrument of creation. It is still an open question whether the programmed computer is unlike other tools of creation."
629 *Ibid* at 293: "Included within this category would be works of artificial intelligence, algorithms, firmware, and recombinant DNA."
630 Lemley, Convergence in the Law of Software Copyright?, *supra* note 613 at 6.
631 714 F (2d) 1240 (3d Cir 1983).

computer programs included source code – spelled-out human-readable commands, usually written in a programming language like C++ or Python,[632] – or object code – written in binary, comprised of ones and zeroes, and embedded in read-only memory (ROM) readable only by a computer.[633] This meant, as the court held in *Stern Electronics, Inc v Kaufman*, that computer programs (like video games) could be simultaneously protectable in several ways by copyright law: as audiovisual; graphical or pictorial; and/or literary works.[634] Copyright protection for computer programs remains problematic, however, as Lemley opines: "[W]hen only concepts and not actual language have been copied, courts are put to the test of distinguishing idea from expression."[635]

ii. Beginning in the 1990s, International Agreements Locked Step with the US.

Significant international agreements adhered to software's protection as literary works. Vaver explained how this push "gained momentum in the 1980s and was entrenched in both *NAFTA* and

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[632] 685 F (2d) 870 (3rd Cir 1982).

[633] *Ibid*; Determann & Nimmer, *supra* note 609 at 168.

[634] Determann & Nimmer, *ibid*. In *Stern Elecs, Inc v Kaufman*, 669 F (2d) 852 at 855–57 (2nd Cir 1982) the court stated: "The display satisfies the statutory definition of an original 'audiovisual work,' and the memory devices of the game satisfy the statutory requirement of a 'copy' in which the work is 'fixed.' … The audiovisual work is permanently embodied in a material object, the memory devices, from which it can be perceived with the aid of the other components of the game … The visual and aural features of the audiovisual display are plainly original variations sufficient to render the display copyrightable even though the underlying written program has an independent existence and is itself eligible for copyright. Nor is copyright defeated because the audiovisual work and the computer program are both embodied in the same components of the game."

[635] Lemley, Convergence in the Law of Software Copyright?, *supra* note 613 at 6-7. Lemley clarifies: "Two factors make the idea-expression dichotomy particularly difficult to apply in computer cases, however. First, computer programs are written for a utilitarian purpose. Expression in the code or structure and organization of a program is normally only incidental to that purpose. Courts must therefore identify and protect that incidental material, while leaving the functional aspects of the program free for all to duplicate. Second, computer programs are technically complex and inaccessible to the lay person, a category which includes most federal judges. Judges are therefore forced to rely on second-hand knowledge and testimony about the programming process to a far greater extent than in other literary cases." However, Miller, *supra* note 59 at 991-2, had a different opinion: "An examination of the judicial developments in the software copyright area demonstrates that the fears of monopolization of the ideas or the utilitarian features of programs have not come to pass, and that the courts have proven themselves capable of understanding the technology, applying copyright doctrine to it, and distinguishing the copyrightable and uncopyrightable elements of computer programs. In particular, they have proven themselves skillful at limiting the scope of copyright protection to avoid extending it to a program's functional aspects. Thus, understanding the case law is essential; it is also a necessary antecedent to exploring the claims for copyright exceptions for decompilation and interfaces."

*TRIP*s in the early 1990s."[636] The 1996 WIPO Copyright Treaty (*WCT*) following *TRIP*s and *Berne*, stating: "Computer programs are protected as literary works within the meaning of Article 2 of the Berne Convention. Such protection applies to computer programs, whatever may be the mode or form of their expression."[637] Many other countries, including Canada, followed suit by adapting their copyright law accordingly.[638]

The EU significantly impacted (and still impacts) the development of computer program legal protection.[639] Several EU directives are responsible for EU's copyright protection for computer programs: the 1991 *Related Rights Directive*, the 2001 *Directive on Copyright Harmonisation*,[640] and the 2009 *Software Directive*.[641]

The *Software Directive* required EU member states adopting software-as-literary-work protection under *Berne*, "as long as they are original in the sense that they are their author's own intellectual creation."[642] It harmonized with US law, protecting only software's expressive elements, leaving "functionality, technical interfaces, programming language or data file formats" non-copyrightable.[643]

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636 Vaver, *supra* note 237 at 313.
637 *Ibid* at 70 and 313. See art 1705.1(a) of the *North American Free Trade Agreement Between the Government of Canada, the Government of Mexico and the Government of the United States*, 17 December 1992, Can TS 1994 No 2 (entered into force 1 January 1994) [NAFTA]: [copyright] proclaimed that "all types of computer programs are literary works within the meaning of the Berne Convention and each Party shall protect them as such […]. Further, art 10(1) of *TRIP*s, *supra* note 567: "Computer programs, whether in source or object code, shall be protected as literary works under the Berne Convention (1971)." Lastly, art 4 of *WCT*, 20 December 1996, 36 ILM 65. "[F]or greater certainty", the new *United States-Mexico-Canada Agreement* (USMCA), clarifies that a work "includes a cinematographic work, photographic work and computer program." See the Intellectual Property part, online (pdf): <ustr.gov/sites/default/files/files/agreements/FTA/USMCA/20%20Intellectual%20Property.pdf>.
638 Canada's *Copyright Act*, RSC 1985, *supra* note 590 at s 2 – definitions – "literary work includes tables, computer programs, and compilations of literary works; (oeuvre littéraire)."
639 Thus, it is not surprising that the EU was also one of the first to consider a policy recommendation for robots' legal rights. See the EU Parliament Report, *supra* note 185. Though, this initiative was put on halt by the EU Commission.
640 EU, *Commission Directive (EC) 1991/250/EEC of 14 May 1991 on the Legal Protection of Computer Programs*, [1991] OJ, L 122/42 [*Related Rights Directive*]; *2001 Directive on Copyright Harmonisation*, *supra* note 431.
641 EU, *Commission Directive (EC) 2009/24/EC of 23 April 2009 on the Legal Protection of Computer Programs*, [2009] OJ, L 111/16 [*Software Directive*].
642 Bently & Sherman, *supra* note 406 at 49.
643 Determann & Nimmer, *supra* note 609.

iii. From the 1990s Onward, US Courts Defined "Originality" and "Expression" of Software as Literary Works.

Copyright law was always designed to protect literary work;[644] but copyrightability of such works requires more than mere fixation of copyrightable subject matter. In other words, a computer program is *prima facie* copyrightable if fixed in source or object code, but it must embody sufficient originality and expression to earn entitlement to robust copyright protection. Otherwise, for example, as in section 102(b) of the *US Copyright Law*, it is a non-copyrightable "idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work."[645] Determann and Nimmer claim that, historically, this exception "made software particularly ill-suited for copyright protection."[646]

Establishing originality in computer programs proved complex. Copyright protection for computer programs required creativity; but creativity was disadvantageous for computer programmers, which in many cases aimed to create the simplest and easiest program: "[S]oftware's value is usually measured precisely by its functionality and efficiency, aspects expressly excluded

[644] US Const art I, § 8, cl 8. As Lemley explains: "Copyright law was designed in order to protect physical works of creative authorship which could be used without being copied." Lemley, Convergence in the Law of Software Copyright?, *supra* note 613. Moreover, according to Samuelson, "Although user interfaces of computer programs can be highly fanciful or artistic in character – videogames being perhaps the clearest example – many are more functional in character. Some may be too functional to be protectable by copyright. That this should be so is not surprising in view of the fact that computer programs themselves are properly regarded as functional writings, and the role of user interfaces is to provide users with access to program functionalities." See Pamela Samuelson, "Computer Programs, User Interfaces, and Section 102(b) of the Copyright Act of 1976: A Critique of *Lotus v Paperback*" (1992) 55 Law & Contemp Probs 311 at 339.
[645] *Copyright Law of the United States*, *supra* note 627 § 102(b) (2012).
[646] Determann & Nimmer, *supra* note 609 at 166.

from copyright protection."[647] This paradox was perhaps overlooked in *Apple*[648] where "the 1980 amendments reflect Congress' receptivity to new technology and its desire to encourage, through the copyright laws, *continued imagination and creativity* in computer programming.[649] So, the incongruence between copyright reform's objectives and the business practice realities led to uncertainty in copyright infringement case outcomes.[650]

In 1992, the Second Circuit in *Computer Associates International v Altai*,[651] implemented a more reliable analytical framework – the *Abstraction-Filtration-Comparison Test*.[652] This test has three stages: (1) the abstraction step dissects the plaintiff's program "into its constituent structural part"; (2) the filtration step "sift[s] out all non-protectable material" like ideas, methods, facts, and public domain and merger doctrine material[653] (in this stage, the court should "assess

[647] *Ibid* at 168. See also: Mark A Lemley & David W O'Brien, "Encouraging Software Reuse" (1997) 49 Stan L Rev 255; Peter S Menell, "An Analysis of the Scope of Copyright Protection for Application Programs" (1989) 41 Stan L Rev 1045; Jane C Ginsburg, "Four Reasons and a Paradox: The Manifest Superiority of Copyright Over Sui Generis Protection of Computer Software" (1994) 94 Colum L Rev 2559; Joseph P Liu & Stacey L Dogan, "Copyright Law and Subject Matter Specificity: The Case of Computer Software" (2005) 61 NYU Ann Surv Am L 203; Miller, *supra* note 59.

[648] *Franklin*, *supra* note 631. See also Mark A Lemley et al, *Software and Internet Law*, 4th ed (New York: Wolters Kluwer Law Business, 2011).

[649] [Emphasis added]. *Franklin*, *ibid* at 1253-4. This statement corresponds with *Feist's* general notion concerning creativity. As in *Feist,* the court rejected the sweat of the brow approach.

[650] A few important milestones in the legal development of copyright protection in the US can be traced to the following cases: *Lotus Dev Corp v Paperback Software Int'l,* 740 F Supp 37 (Dist Ct Mass 1990) (the scope of copyrightability of computer programs); *Apple Computer Inc v Microsoft Corporation*, 35 F (3d) 1435 (9th Cir 1994) (visual graphical user interface (GUI)) and *Lotus Development Corporation v Borland International Inc*, 516 US 233 (1996) (the extent of software copyright in regard to user interface).

[651] 982 F (2d) 693 (2nd Cir 1992). Affirmed in *Oracle Am Inc v Google Inc*, 750 F (3d) 1339 (Fed Cir 2014) at 1354. In this case, Oracle purchased Sun Microsystems (the developer of Java), and sued Google for patent and copyright infringement for implementations of Java API (application programming interface) packages in Google's Android software development kit. The District Court denied Oracle's claim for copyright protection and the Federal Circuit reversed its decision. Google's petition to SCOTUS was denied on June 29, 2015. In May 2016, a new trial began concerning Google's claim for fair use. On May 26, 2016, after a two-week trial, the jury reached a verdict concluding that Google Android's OS re-implementation of Oracle Java API is considered "fair use". Following the decision, Oracle appealed to the US Court of Appeals, and on March 2018 the court ruled in favour of Oracle concluding that Google's use was not "fair". See *Oracle Am, Inc v Google Inc*, No 17-1118 (Fed Cir 2018).

[652] In *Altai*, *ibid,* the court expressed its disdain for the *Whelan Assoc Inc v Jaslow Dental Lab Inc*, 797 F (2d) 1222 (3rd Cir 1986) decision, holding, *Altai*, *ibid* at 706: "We think that Whelan's approach to separating idea from expression in computer programs relies too heavily on metaphysical distinctions and does not place enough emphasis on practical considerations." See also Audrey F Dickey, "*Computer Associates v. Altai and Apple v. Microsoft:* Two Steps Back from Whelan?" (1993) 9 Santa Clara Comp & High Tech LJ 379.

[653] Determann & Nimmer, *supra* note 609 at 169.

whether the expression is original to the programmer or author");[654] and, (3) in the final step compares any remaining creative expression to the impugned program.[655]

2.3.1.2 Protecting Software by Patenting

Patent law offers an alternative framework for software protection.[656] Historically, many countries were hesitant to exploit patent law for software, fearing it would stymie innovation.[657] This fear subsided in recent decades; patent law's role in protecting software has increased since 1977.[658] This shift stems from the US *Patent Act*'s patentability criteria: "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor."[659] In past decades, the Supreme Court of the United States (SCOTUS) interpretate the statue in a way that excluded non-physically manifested computer programs, which SCOTUS viewed as mathematical algorithms, and thus abstract ideas which patent laws could not protect.[660]

i. US Courts thus Took a Narrow View of Software Patentability.

American software patent mechanisms began with the three SCOTUS decisions establishing the

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[654] *Oracle*, *supra* note 651 at 1357.
[655] *Ibid*.
[656] Patent law poses a challenge to AI as well. As Ryan Abbott suggests, under US Patent law only a human can be qualified as an individual. Abbott shows that the US Patent Office granted patents for inventions by computers without knowing that the inventor was the computer itself. See Ryan Abbott, "I Think, Therefore I Invent: Creative Computers and the Future of Patent Law" (2016) 57 Boston College L Rev 1079.
[657] Vaver, *supra* note 237 at 313. Vaver explains that these countries thought that "programs should be free to create their own applications without fear of treading on some patent they knew nothing of." For this reason, the EU Patent Convention (1973) did not allow patenting of computer programs as such.
[658] Bently & Sherman, *supra* note 406 at 475. Bently & Sherman argue that "it was commonly thought that copyright law rather than patents would be the area of intellectual property law that would regulate the creation and use of computer programs."
[659] *US Patent Act*, 35 USC § 101 (1952) [US Patent Act].
[660] As a side note, these decisions can also explain the challenge that law is facing when encountering new technology. It is thus not without merit to expect similar outcomes when addressing AI technology in the future.

Freeman-Walter test:[661] *Gottschalk v Benson* (1972),[662] *Parker v Flook* (1978),[663] and *Diamond v Diehr* (1981).[664] The trend continued in the 1994 decision, *In re Alappat,*[665] which developed the *useful, concrete, and tangible test*.[666] In these cases, the courts consistently distinguished between the unpatentability of mathematical algorithms – arguing that, alone, they are abstract ideas – and the patentability of a useful process incorporating an algorithm.[667] Such a distinction limited patentability, since proving that a program is a useful process is harder to accomplish than submitting mere algorithms.

Despite this limit, programming patent floodgates opened[668] after the US Federal Circuit

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661 The Freeman-Walter test is a two-part test. First, the courts required to establish if a mathematical algorithm recited (directly or indirectly). Second, "if a mathematical algorithm is found, whether the claim as a whole applies the algorithm in any manner to physical elements or process steps." See Fabio E Marino & Teri H P Nguyen, "From *Alappat* to *Alice*: The Evolution of Software Patents" (2017) 9 Hastings Sci & Tech LJ 1 at 4.

662 409 US 63 (1972). Justice Douglas, at 67, clarified that "[p]henomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work."

663 437 US 584 (1978).

664 450 US 175 (1981). *Diamond* considered a novel decision in which SCOTUS recognized a patent for a rubber-curing process that utilized a computer program algorithm.

665 33 F (3d) 1526 (Fed Cir 1994). Few years later, in *State Street Bank & Trust Co v Signature Financial Group, Inc*, 149 F (3d) 1368 (Fed Cir 1998), the court confirmed *Alappat* decision. In the *State Street Bank*, the Federal Court "found mathematical algorithms, an abstract concept, patentable if 'transformed' or 'performed' by a machine and which provided 'useful, concrete, and tangible' results." Marino & Nguyen, *supra* note 661 at 6.

666 As the court, *re Alappat*, *ibid* at 1557 explains: "[T]he proper inquiry in dealing with the so called mathematical subject matter exception to Section 101 alleged herein is to see *whether the claimed subject matter as a whole is a disembodied mathematical concept*, *whether categorized as a mathematical formula, mathematical equation, mathematical algorithm, or the like*, which in essence represents nothing more than a 'law of nature,' 'natural phenomenon,' or 'abstract idea.' […] *This is not a disembodied mathematical concept which may be characterized as an "abstract idea," but rather a specific machine to produce a useful, concrete, and tangible result*." [Emphasis added]. The Federal Court concluded, *ibid* at 1558, that "[t]he Supreme Court has never held that a programmed computer may never be entitled to patent protection. Indeed, the Benson court specifically stated that its decision therein did not preclude 'a patent for any program servicing a computer.' […] a computer operating pursuant to software may represent patentable subject matter, provided, of course, that the claimed subject matter meets all of the other requirements of Title 35. In any case, a computer, like a rasterizer, is apparatus not mathematics."

667 Cathy E Cretsinger, "AT&T Corp. v Excel Communications, Inc." (2000) 15 BTLJ 165 at 166. Cretsinger further explains the difference between the Federal Court and SCOTUS' decisions stating that "[b]oth *Alappat* and *State Street Bank* addressed machine claims, where structure omitted from the claim may be supplied from the disclosure. The Supreme Court cases, in contrast, addressed process claims and emphasized the presence or lack of physical elements. Thus, it was not clear whether the Federal Circuit would apply its expansive *Alappat* test to process claims", *ibid* at 170. See Marino & Nguyen, *supra* note 661. Marino & Nguyen opined further that "the Diehr Court held that certain types of mathematical subject matter, standing alone, represent nothing more than abstract ideas until reduced to some type of practical application." *Ibid* at 3.

668 Vaver, *supra* note 237 at 315. PTO statistic data shows a constant increase in the application of patents under Class 705 between 2002 and 2014 (the IPO defined Class 705 as "the generic class for apparatus and corresponding methods

Courts removed any lingering doubt about the patentability of computer programs in the later *State Street Bank* (1998) and *AT&T* (1999) decisions.[669] The courts in *State Street* and *AT&T* finally withdrew the need to prove the presence of a physical component or transformation in a process claim as critical elements for approving a patent. The court in *AT&T* implied that software's unpatentability – and SCOTUS's condition from *Diamond* that physical transformation is a critical component – was a misunderstanding.[670] These rulings also mark the US decision "to part company with the Europeans and allow computer programs to be patented as well."[671]

The patent floodgates closed almost a decade later when the US Federal Court rejected both the *Freeman-Walter-Abele* and the *Useful, Concrete, and Tangible* tests in *Bilski* (2008),[672] adopting instead the *Machine or Transformation Test* (only to be rejected in the SCOTUS appeal two years later),[673] as the *sole* test for process patent eligibility. That test was held only to be "a useful and important clue, an investigative tool" for patentability determinations.[674] Vaver notes that the idea of being "'useful, tangible and concrete,' without more, entitl[ing] a process to be patented," was "unanimously discarded" after *Bilski* (2010).[675]

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for performing data processing operations, in which there is a significant change in the data or for performing calculation operations wherein the apparatus or method is uniquely designed for or utilized in the practice, administration, or management of an enterprise, or in the processing of financial data. This class also provides for apparatus and corresponding methods for performing data processing or calculating operations in which a charge for goods or services is determined", see online: <uspto.gov/web/offices/ac/ido/oeip/taf/def/705.htm>. It is interesting to indicate that in the year 2015 we saw a drop in the application that continued in the year 2016 as well.

669 *AT & T Corp v Excel communications Inc*, 172 F (3d) 1352 (Fed Cir 1999). In that case, AT & T sued Excel for the infringement of their "184 patent". The patent involved technology improvement for calculating the price of direct-dialed long-distance calls; *State Street Bank*, *supra* note 665.

670 *AT* & T, *ibid* at 1358-9: "The notion of 'physical transformation' can be misunderstood. In the first place, it is not an invariable requirement, but merely one example of how a mathematical algorithm may bring about a useful application. As the Supreme Court itself noted 'when [a claimed invention] is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101.' Diehr … The 'e.g.' signal denotes an example, not an exclusive requirement."

671 Vaver, *supra* note 237 at 315.

672 *In re Bernard L Bilski and Rand A Warsaw*, 545 F (3d) 943 (Fed Cir 2008).

673 *Bilski v Kappos*, 561 US 593 (2010).

674 *Ibid* at 604.

675 Vaver, *supra* note 237 at 315.

Alice Corp v CLS Bank (2014) is the most recent important development on software patentability.[676] In *Alice*, SCOTUS reaffirmed the two-step test, adopted in *Mayo Collaborative Services v Prometheus Labs*: the first step asks if the patent contains an abstract idea (like an algorithm), and if it does, the second step requires the patent add "something extra" – embodying an "inventive concept" – for patentability.[677] Ruling that Alice's patent claims were ineligible under the US *Patent Act*,[678] SCOTUS determined at the first step that they were "drawn to the abstract idea of intermediated settlement."[679] SCOTUS concluded at the second step that something extra was lacking, stating that "the method claims, which merely require generic computer implementation, fail to transform that abstract idea into a patent-eligible invention."[680]

The main problem in *Alice* is the "something extra" requirement in order for software to be sufficiently inventive and patentable. This stringent requirement to meet innovation is unclear in practice since "*Alice* left open the nature of the technological improvement that must exist before an application of an abstract concept may be patentable as 'inventive'."[681]

The lack of clarity in "something extra" is exacerbated in the software industry, which

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[676] *Alice Corp v CLS Bank International*, 134 S Ct 2347 (2014).
[677] The test is explained as follows – "First, we determine whether the claims at issue are directed to one of those patent-ineligible concepts ... If so, we then ask, '[w]hat else is there in the claims before us?' ... To answer that question, we consider the elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application ... We have described step two of this analysis as a search for an 'inventive concept' – *i.e.*, an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself'." *Alice*, *ibid* at 2355. See also *Mayo Collaborative Servs v Prometheus Labs, Inc*, 132 S Ct 1289 (2012).
[678] US *Patent Act*, *supra* note 659.
[679] *Alice*, *supra* note 676 at 2355. SCOTUS further offers, at 2356: "On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.*, the use of a third party to mitigate settlement risk. Like the risk hedging in *Bilski*, the concept of intermediated settlement is 'a fundamental economic practice long prevalent in our system of commerce'."
[680] *Alice*, *supra* note 676 at 2350. If the patent contains an abstract idea (like an algorithm), and if it does, the second step requires the patent to add "something extra" – embodying an "inventive concept" – for patentability.
[681] Marino & Nguyen, *supra* note 661 at 13.

significantly unique from other industries, as Ben Klemens noted.[682] First, a detailed description of software often *is* the software – for example, pop-up window – making it very difficult to distinguish between "idea and its implementation".[683] Second, programs are math; this forms a paradox: while the courts agree that pure math is unpatentable, software might be – "yet the two are equivalent".[684] Third, if a patent on a particle of code restricts other users from using that data or technique, it in turn hinders development of other programs. Finally, *Alice*'s decision runs contrary to programmers' desired simplicity of useful software, and limits appropriate patent candidates by requiring the patent to demonstrate "something extra".

Since most software contains abstract ideas,[685] *Alice* may lead to a substantial decrease of business method and computer-implemented innovations patents.[686] It was unsurprising that, following *Alice,* the US software industry sector and legal community expressed concern about narrowing computer programs patentability, regressing to the pre-*Diamond* era.

On the other hand, others applaud SCOTUS's decision to limit patents on programs based heavily on data and, consequently, strengthen competition. Data is the fuel of future developments,

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[682] Ben Klemens, *Math You Can't Use: Patents, Copyright, and Software* (Washington, DC: Brookings Institution Press, 2005) at 4.

[683] *Ibid*. Klemens further explains: "For the pop-up window, the idea is a window that automatically opens and moves to the front when the user views a new page … For Prozac, the idea is a selective serotonin reuptake inhibitor (SSRI) … Traditionally, patents have been granted to implementations of ideas and not to the ideas themselves – there are a dozen SSRIs on the market that did not infringe on the Prozac patent. But in software, the pattern has been reversed: most patents cover ideas like the pop-up window, regardless of implementation, so they tend to be too broad."

[684] Klemens, *supra* note 682. The courts resolved this contradiction by providing a set of roles and complex tests that might, under certain conditions, allow mathematical algorithms' patents. However, these attempts to reconcile the contradictions does not always succeed.

[685] Marino & Nguyen, *supra* note 661 at 13.

[686] As Marino & Nguyen, *ibid* at 2, offer: "[S]ubsequent decisions by the Federal Circuit and the lower courts have applied the *Alice* test to all types of software patents, creating a much more restrictive set of rules for patent eligibility of software implemented inventions." In a prior case, Justice Breyer provided: "We must determine whether the claimed processes have transformed these unpatentable natural laws into patent-eligible applications of those laws. We conclude that they have not done so and that therefore the processes are not patentable." See *Mayo*, *supra* note 677 at 1294. See also Jasper L Tran, "Two Years After Alice v. CLS Bank" (2016) 98 J Pat & Trademark Off Soc'y 354; Lucas S Osborn, "Intellectual Property Channeling for Digital Works" (2018) 39 Cardozo L Rev 1303 at 1329.

and its availability is crucial for a machine-learning technology's progression.[687] As Calo highlighted,[688] distilling high-quality data is essential for any government policy. By limiting the ability to patent software that relies heavily on data – even processed high-quality data – we make the data public goods, thus allowing programmers access to it for the benefit of future progress.

Alice provided inadequate guidance for lawyers and programmers to follow.[689] And after a short ambiguous period,[690] the Federal Court provided some guidance to software patentees. According to Judge Hughes in *Enfish* (2016),[691] *Alice* did not conclude that all computer-related technology improvements are "inherently abstract and, therefore, must be considered at step two." Rather, it is, "relevant to ask whether the claims are directed to an improvement to computer functionality versus being directed to an abstract idea, even at the first step of the *Alice* analysis."[692] Marino and Nguyen called *Enfish* "the broad strokes of an analytical framework."[693]

In examining the post-*Alice* decisions, Marino & Nguyen distilled the conditions needed to establish software patentability: "First, the Court will determine what distinguishes the invention from the prior art. If the novel feature is the use of a computer, the patent will likely be invalid, while if the novel feature is a better computer, the patent will likely be valid." As in other

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687 Leading AI systems use artificial neural networks that, like the human brain, learn from experience. This is why, data is so important for the development of AI and should be treated as oil or fuel. See Michael Palmer, "Data is the New Oil" (3 November 2006), online (blog): *Michael Palmer Blog* <ana.blogs.com/maestros/2006/11/data_is_the_new.html>. On the other hand, there are different views claiming that oil is not the right equivalent since, data, contrary to oil, is unlimited. See Bernard Marr, "Here's Why Data Is Not The New Oil" (5 March 2018), online: *Forbes* <forbes.com/sites/bernardmarr/2018/03/05/heres-why-data-is-not-the-new-oil/#59458ee13aa9>.
688 Calo – AI Policy, *supra* note 42.
689 Osborn, *supra* note 686, argues: "After Alice, the landscape for software-related patents is at best uncertain and at worst bleak."
690 Following *Alice*, the Federal Court and SCOTUS failed to provide guidance to *Alice's* requirements. Specifically, what constitute an abstract idea: "[N]one of the cases that survived the Alice analysis did so based on the first prong of the analysis, patent-eligibility was determined exclusively based on the second prong." Marino & Nguyen, *supra* note 661 at 22.
691 *Enfish, LLC v Microsoft Corp*, 822 F (3d) 1327 (Fed Cir 2016).
692 *Ibid* at 1335.
693 Marino & Nguyen, *supra* note 661 at 28.

jurisdictions, it seems that American courts will likely try to redefine the boundaries of software patentability in the future.

ii. The UK Takes a Narrow View on Software Patentability.

The UK *Patents Act 1997* lacks explicit recognition of computer programs as inventions.[694] However, as Bently and Sherman explain, "One of the most important changes that led to the liberalization of the protection offered to computer-related inventions in the United Kingdom … was the decision that an invention that includes a computer program could be patentable so long as the invention as a whole was technical."[695] This approach did not last long. Following *Aerotel* (2008)[696] the UK's Intellectual Property Office (IPO) reinstated the "old practice of rejecting all computer program claims."[697] It backtracked somewhat in February 2008, when it revised its practice to include patentability for a computer program.[698] In the recent *HTC* case, L. J. Kitchin

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[694] *Patent Act 1977* (UK). See also UK, Intellectual Property Office, *Manual of Patent Practice (MoPP)* (2018) s 1.35-1.39.2, online (pdf): <assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/719293/Manual-of-Patent-Practice-July-2018.pdf> [UK MoPP].

[695] Bently & Sherman, *supra* note 406 at 476. In *Vicom/Computer-related invention*, T 208/84 [1987], it was said "that 'an invention which would be patentable in accordance with conventional patentability criteria should not be excluded from protection by the mere fact that for its implementation modern technical means in the form of computer programs are used.' This approach was adopted and endorsed by a number of decisions in the United Kingdom." Consequently, while computer programs are not considered eligible for patent protection in the UK, patent applications that *contain* a computer program might be patentable, as long as it can be shown that the program is technical by its nature. Bently & Sherman, *ibid* at 477, concluded: "[A] computer program product could be patentable if it resulted in additional technical effects that went beyond the 'normal' physical interaction between the program (software) and the computer (hardware) on which it was run."

[696] *Aerotel v Telco Holdings*, [2006] EWCA Civ 1371.

[697] Bently & Sherman, *supra* note 406 at 479. As Bently and Sherman indicated, the post-Aerotel policy "created a gap between the United Kingdom and EPO," and obviously between the UK and the US.

[698] This revision was the outcome of implementing L J Kitchin's reservations in regard to *Aerotel's* decision in *Astron Clinica v Comptroller General Patents*, [2008] EWHC 85 at para 51: "In a case where claims to a method performed by running a suitably programmed computer or to a computer programmed to carry out the method are allowable, then, in principle, a claim to the program itself should also be allowable. I say, 'in principle' because the claim must be drawn to reflect the features of the invention which would ensure the patentability of the method which the program is intended to carry out when it is run." This decision was reaffirmed in *Symbian v Comptroller-General of Patents*, [2008] EWCA Civ 1066. *Symbian* decision "clarified that inventions are potentially patentable even were their technical contribution is limited to the computer […]." Bently & Sherman, *supra* note 406 at 479-480. Following *Symbian*, the IPO updated the practice notice to include additional class of inventions "which improve the operation of a computer by solving a problem arising from the way the computer was programmed," IPO Practice Notice, *Patents Act* 1977: Patentability Subject Matter (8 December 2008). Therefore, the IPO requires to determine whether

followed this reasoning in overturning a UK High Court (Justice Floyd) decision that found two of Apple's related patents invalid. As L. J. Kitchin explains:[699]

> *"I believe the judge took his eye off the ball in focussing on the fact that the invention was implemented in software and in so doing failed to look at the issue before him as a matter of substance not form. Had he done so he would have found that the problem and its solution are essentially technical in nature and so not excluded from patentability."*

Nonetheless, UK software patentability remains restrained, as "an ordinary computer program used in a general-purpose computer would normally not be patentable in the United Kingdom."[700]

iii. Canada Splits the Difference Between the US and the EU/UK Approaches.

The Canadian approach to software patent protection was inspired by software developments and the American legal approach. As Vaver states, "In 1978 the Canadian PO decided that computer programs were effectively algorithms … and so fell under the prohibition against patenting abstract theorems."[701] In the following decades, the Canadian Patent Office (CPO) was accordingly reluctant to issue software patents.[702] Until *Diamond* (1981),[703] "Patents were granted for a 'computing apparatus programmed in a novel manner, where the patentable advance is in the apparatus itself,' and for a 'method or process carried out with a specific novel apparatus devised

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the invention has a technical effect (that does not fall within the excluded categories in the Patent Act). In *AT&T Knowledge Ventures v Comptroller General of Patents, Design and Trade Marks*, [2009] EWHC 343 [AT&T], the court outlined few signals and criteria to establish if an invention involving computer software is patentable under the *UK Patent Act*.

[699] *HTC Europe Co v Apple Inc*, [2013] EWCA Civ 451 at para 57 [HTC].

[700] Bently & Sherman, *supra* note 406 at 482. See also *AT&T* & *HTC*. In *HTC* L. J. Kitchin held, *ibid* at para 44: "For the reasons given in *Symbian*, I believe we must continue to consider whether the invention made a technical contribution to the known art, with the rider that novel or inventive purely excluded subject matter does not count as a technical contribution." However, L. J. Kitchin further states, at para 45, that "it is not possible to define a clear rule to determine whether or not a program is excluded, and each case must be determined on its own facts."

[701] Vaver, *supra* note 237 at 313.

[702] As Vaver, *ibid* at 314, explains: "A computer program might do sums faster than an unaided human, but that did not make doing sums patentable even if useful data resulted. … the PO developed the law on patenting computer programs in the light of the drilling data decision and developments abroad, particularly the United States."

[703] *Diamond*, *supra* note 664.

to implement a newly discovered idea'."[704]

Following *Diamond*, the CPO "accepted that a 'real change in a tangible thing' beyond just the production of information" could be patented.[705] As a result of *re Alappat*[706] the CPO decided in 1995 to allow "patenting of an algorithm that scaled numbers exponentially where the calculation was tied to a physical read-only-memory chip."[707] In the coming decades, the CPO has refined and clarified its position distinguishing between "an abstract scheme, plan or set of rules for operating a computer", which do not fall within the meaning of section 2 of *Canada Patent Act*, and a computer program that could "cause the device it controls to provide a technological solution to a technological problem." Accordingly, where a computer program exhibit novelty and inventiveness the claim might include statutory contribution and thus provide the necessary circumstances "under which a software product comprising a physical memory storing executable code can be patented."[708]

2.3.1.3 Trade Secret Protection Gains Weight after *Alice*

Trade secrets may play a key role in protecting software. Trade secret means information, including programs, that "(i) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means" by other people that can "obtain economic value from its disclosure or use."[709] In other words, trade secrets protection requires that the programmer should not make the code available to the public.

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704 Vaver, *supra* note 237 at 314.
705 *Ibid*.
706 *Alappat*, *supra* note 665.
707 Vaver, *supra* note 237 at 315.
708 See Canada, Ministry of Innovation, Science and Economic Development, *Patent Office: Manual of Patent Office Practice* (Ottawa, 2018) s 16.08.04, online (pdf): <ic.gc.ca/eic/site/cipointernet-internetopic.nsf/vwapj/rpbb-mopop-eng.pdf/$file/rpbb-mopop-eng.pdf>.
709 *Uniform Trade Secrets Act With 1985 Amendments (1985)* § 1(4).

Trade secrets were crucial during the mainframe era (1960s) – since software was rarely distributed in source code then – but during the PC era (1990s), their importance diminished. The rise of copyright protection and the Internet revolution made it relatively easy to view the functional coding behind web pages.[710] Moreover, the decrease of trade secret protection levelled out with the rise of cloud computing companies during the late 1990s.

The advent of cloud computing at the beginning of 1999 heralded multiplayer games like World of Warcraft (2004) and programs like Microsoft Office365 (2011) which contributed to the rise of trade secret protection.[711] Until *Alice*,[712] the use of trade secret protection in the software industry remained constant. *Alice* is expected to enhance the importance of trade secret protection, mainly due to the diminished possibility of patent protection. However, we should bear in mind that trade secret protection remains weak since software can be reverse-engineered unless digitally locked and protected.

2.3.2 The Present: From Computer-Assisted to Artificial Intelligence

The current legal system is built on the assumption that legal rights are only for humans.[713] However, as the human connection to a given work's final output becomes distant, the legal basis for rights is weakened. Contrary to common belief, the question of computer authorship is not new, and "goes back to the early days of computing."[714]

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[710] While some software languages like JavaScript are interpreted by the browser and thus visible; much of the code running on the server itself is still under trade secret protection, and thus not viewable by the user.

[711] It is easier to protect cloud-based programs since large portions of the code (the trade secret candidate) exist on secure servers rather than on end users' computers (as in traditional software). Hence, the common method of reverse engineering (the main loopholes of trade secret protection) is much harder to apply.

[712] *Alice*, *supra* note 676.

[713] With limited exceptions, such as corporations and ship.

[714] Bridy, The Evolution of Authorship, *supra* note 624. Bridy mentions the 1956 Datatron digital computer that compose *Tin Pan Alley* songs (such as *Push Button Bertha*, which the Copyright Office refused to register). See also Bruce E Boyden, "Emergent Works" (2016) 39 Colum J L & Arts 377, stating that "this question has puzzled copyright scholars for decades." See also Jane C Ginsburg & Luke Ali Budiardjo, "Authors and Machines" (2018) Columbia Public Law Research Paper No 14-597, 34:2 BTLJ [forthcoming in 2019] at 2 [Ginsburg & Budiardjo]. Ginsburg &

Indeed, the struggle between humans and technology is a very old issue that scholars have been debating about for almost a century since SCOTUS ruled in the *Burrow-Giles* case about the role of photo cameras in the creation process.[715] And in the past decades, IP scholars have contributed to this discussion in numerous papers and reports.[716]

The line between computer-assisted and computer-generated works is blurring. Arthur Miller classified AI systems into two categories: "systems that use symbolic and those that use *non-symbolic* knowledge representation."[717] Symbolic AI "employs a specialized language to encode knowledge, much as a dictionary uses a phonetic alphabet to encode information on pronunciation or as DNA encodes information on the functioning of living things."[718] Non-symbolic AI "attempt[s] to emulate the workings of the human brain, in which knowledge is thought to be distributed across groups of neurons."[719] Miller's work in the early 1990s focused on symbolic AI since, at the time, he believed that non-symbolic AI was not yet advanced enough to be considered as a plausible possibility.

Currently, computer-generated programs are "zombie" like: able to carry precondition commands but lacking in unique characteristics of human free will. Nonetheless, computer-generated programs may develop to express more creative elements. Expression of original elements may qualify their creations for copyright or patent protection, depending on the nature of

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Budiardjo, at 55, further explain: "Artificial intelligence, as a concept, as a practical field of computer science, and as a challenge to legal norms, is far from new. Legal commentators have since the 1980s contemplated how intellectual property law might deal with AI, and the legal academy has developed a substantial body of commentary on the concepts of automated "creativity" and its potential impact on intellectual property rights."

[715] *Burrow-Giles Lithographic Co v Sarony*, 111 US 53 (1884).

[716] Samuelson, *supra* note 423. See also US, Copyright Office, *Sixty-Eighth Annual Report of the Register of Copyright for the Fiscal Year Ending June 30, 1965* (Washington, DC: The Library of Congress, 1966) at 5, online (pdf): <copyright.gov/reports/annual/archive/ar-1965.pdf>.

[717] Miller, *supra* note 59 at 1037.

[718] *Ibid*. I would consider most common machine translation programs, such as Google Translate, examples of symbolic AI. See David Vaver, "Translation and Copyright: A Canadian Focus" (1994) 4 EIPR 159 [Vaver, Translation and Copyright].

[719] Miller, *ibid*.

the work. Abbott describes the differences: "Computer involvement might be conceptualized on a spectrum: on one end, a computer is simply a tool assisting a human inventor; on the other end, the computer independently meets the requirements for inventorship" in patents or originality in copyright.[720]

In a recent paper, Jane Ginsburg and Luke Budiardjo offer a quasi-different view on the subject. They provide three categories of generative machines: "Ordinary tools", "partially generative machines", and "fully generative machines". However, they are framing the distinctions according to the designer's (*i.e.,* the programmer) and user's contributions. Ordinary tools are "machines which rely solely on the creative contributions of their users"; fully generative machines "rely entirely on the creative contributions of their *designers* and which do not require any creative choices made by the users"; and, partially generative machines "combine the creative contributions of both the user and the designer of the tools."[721]

It should be noted, however, that according to Ginsburg and Budiardjo, there is no difference between a machine and a human assistant (like an illustrator or an amanuensis). All machines – computer-assisted and fully generative machines – are simply a tool for the execution of human creativity. Even the "more sophisticated 'learning' models which we may not precisely understand or supervise … [do] not change our initial conclusion that machines are not 'creative'."[722] I will address these ideas in Part III and IV as well. Suffice it to say, at this point, that I do not share Ginsburg and Budiardjo's vision (*i.e.*, there is no creative machines, only

[720] Abbott, *supra* note 656 at 1094. Abbott provides a few examples: "[…] when a computer is functioning as a calculator or storing information … the computer is not participating in the invention's conception." Other examples are "analyzing data in an automated fashion, retrieving stored knowledge, or by recognizing patterns of information". In all those scenarios "the computer still may fail to contribute to conception."
[721] Ginsburg & Budiardjo, *supra* note 714 at 67.
[722] *Ibid* at 63.

creative designers) regarding the human/machine distinction.

In this section, I shall outline the legal framework for computer-generated works in key jurisdictions. In doing so, I am attempting to survey the differences and to reflect on the possibility of recognizing computer-generated/AI works under current copyright laws.

The UK legal framework is, as Guadamuz describes, "deceptively straightforward [and its] elegant and concise wording … does away with most potential debates about the creative works produce by artificial agents."[723] Copyright protection under the *CDPA* requires that: (1) the creation falls into a category of protected work (*i.e.*, literary, dramatic, musical or artistic); (2) qualifying for protection according to UK law;[724] and, (3) its copyright has not expired. The *CDPA*'s section 9(3) adds that, if a computer-generated work falls within a category under (1), its author is "the *person* by whom the arrangements necessary for the creation of the work are undertaken."[725]

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[723] Guadamuz, *supra* note 422 at 175.
[724] Dorotheou, *supra* note 423 at 85-86. Guadamuz, *ibid* at 175-6.
[725] [Emphasis added]. It should be noted that section 9(3) does not include sound recordings, films or broadcasting.

The *CDPA*'s section 178 (minor definitions) further defines a computer-generated work as "a work … generated by computer in circumstances such that there is no human author of the work."[726] Under the *CDPA*'s section 12(7), copyright in computer-generated works "expires at the end of the period of 50 years." Further, the computer-generated author is exempt from any moral rights (*i.e.*, the rights to be identified as the author and to object to derogatory treatment of the work).[727]

The distinction between computer-assisted and computer-generated works in the UK is, however, not very clear. In many cases, a computer-generated work is simply a more advanced computer-assisted work which fall under section 9(3). A computer can act as a tool, similarly to a pen used in drawing, merely assisting with execution, not conception or substantial production.[728] Simply put: a tool, in which the user "contributes to the contents (expression) of the work."[729]

Although the *Express Newspaper* decision is consistent with section 9(3), "there is some ambiguity as to who the actual author is."[730] The same rationale could be used to allocate copyright

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[726] See also Catherine Colston & Jonathan Galloway, *Modern Intellectual Property Law*, 3rd ed (Routledge, 2010) at 339. Justice Streicher from The Supreme Court of Appeal of South Africa relied on section 9(3) in *Haupt v Brewers Marketing Intelligence (Pty) Ltd*, [2006] ZASCA 40 at para 31, 2006 (4) SA 458: "In my view a work only qualifies as having been computer-generated if it was created by a computer in circumstances where there is no human author of the work. If there is a human author the work is computer assisted and not computer-generated. That is the meaning ascribed to 'computer-generated' in s 178 of the Copyright, Designs and Patents Act, 1988 of the United Kingdom. It also accords with the recommendation of the Australian Copyright Law Review Committee in respect of computer software protection."

[727] Both are limited and recognized moral rights in the UK. Sections 79(2)(c) and 81(2).

[728] *Ibid*. See also *Express Newspapers Plc v Liverpool Daily Post & Echo Plc*, [1985] 3 All ER 680, [1985] 1 WLR 1089 at 1093 (Ch D (Eng)). In this case, a programmer created a grid containing a random selection of letters and numbers for a game in the newspaper. The claim was that there could be no copyright protection for the grids since humans did not make them. Concerning Judge Whitford ruling, Colston & Galloway have stated that "[i]t may have been very significant that it was the programmer who operated the computer. He used undoubted skill in programming the computer to produce selections for the grids' contents … However, it was the programmer, and not the computer operator, in this case, which supplied the content of the resulting grids. Had someone else operated the computer, it is not clear that the result in this case would be the same … although a good deal of skill would have gone into the program, it is artificial to regard a mere operator of it as the human author of the resulting selection of the grids' contents." *Modern Intellectual Property Law*, *supra* note 726.

[729] *Modern Intellectual Property Law*, *ibid.*

[730] Guadamuz, *supra* note 422 at 176.

to the users of the program rather than the programmers.[731] Take *Word* for example. There can be no valid claim that the author of my dissertation is Microsoft and not me. However, with advancements in machine-learning technology, these scenarios might become more and more complex.[732]

Guadamuz shares the example of machine learning in developing video games. In these games, the user affects the program every time he or she plays the game.[733] Using the *Word* analogy, Guadamuz explains: "[O]ne would own all new worlds generated by the software because the user made 'the arrangements necessary for the creation of the work'. Yet clearly the game developers make a strong claim in their end-user licence agreement that they own all intellectual property arising from the game."[734]

The reason the UK legal framework is so important is because many other countries share it. Ireland's *Copyright and Related Rights Act*, for example, echoes the UK model assigning copyright to "the person by whom the arrangements necessary for the creation of the work are undertaken."[735] A similar legal framework exists – using almost identical wording – in New

[731] Angela Adrian, *Law and Order in Virtual Worlds: Exploring Avatars, Their Ownership and Rights: Exploring Avatars, Their Ownership and Rights* (New York: IGI Global, 2010). See also Guadamuz, *ibid* at 176.
[732] Guadamuz, *ibid* at 176.
[733] The program, however, has a significant effect on the process: "The promise of this type of development is to have gaming environments created not by the programmers, but that the program itself based on predetermined rules and algorithms. The potential is to have games with no end, where content is generated by the computer in a unique manner each time that the player logs in … While the programmers set parameters, the machine literally builds new virtual worlds every time it runs." Guadamuz, *ibid* at 172.
[734] *Ibid* at 176.
[735] *Copyright and Related Rights Act 2000* (Ir), s 21(f).

Zealand,[736] India,[737] South Africa[738] and Hong Kong.[739]

Copyright law in the UK and other UK "inspired" countries explicitly limits authorship to persons. Vaver has noted that "computer-generated works join the list of other works for which the UK Act has created a fictitious author: the producer of a film or sound record, the maker of a broadcast, the provider of a cable service programme – almost all of which are equally fictitious *persons*, that is, corporations rather than humans."[740]

The *CDPA* provides no instructions for when a work's author is not human, for example, as with independent AI-created work.[741] Mr. Justice Richard Arnold has recently suggested that AI-generated works could not be protected under UK copyright law and section 9(3) (the computer-generated exception) should not apply to AI.[742]

Since protection for computer-generated works relies on a lack of any human author, it seems peculiar to apply the originality test to them. Thus, the *CDPA* does not provide originality criteria for computer-generated works that it acknowledges are copyrightable.[743] In this regard, the

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[736] *New Zealand Copyright Act 1994* (NZ), s 5(2)(a): "in the case of a literary, dramatic, musical, or artistic work that is computer-generated, the person by whom the arrangements necessary for the creation of the work are undertaken."
[737] *India Copyright Act 1957* (IN), s 2(d)(vi): "in relation to any literary, dramatic, musical or artistic work which is computer-generated, the person who causes the work to be created."
[738] *South Africa Copyright Act 1978* (S Afr) (as amended up to Copyright Amendment Act 2002), s 1(1)(h): "a literary, dramatic, musical or artistic work or computer program which is computer-generated, means the person by whom the arrangements necessary for the creation of the work were undertaken."
[739] *An Ordinance to Make Provisions in Respect of Copyright and Related Rights and for Connected Purposes 1997* (HK), s 11(3): "In the case of a literary, dramatic, musical or artistic work which is computer-generated, the author is taken to be the person by whom the arrangements necessary for the creation of the work are undertaken."
[740] Vaver, Translation and Copyright, *supra* note 718 at 162. Vaver explains that "[t]he reason for protection has nothing to do with encouraging human creativity and everything to do with protecting the product of capital investment from unfair competition or misappropriation."
[741] Dorotheou, *supra* note 423.
[742] Remarks at the Oxford IP Moot, 16 March 2018. Following the *Conversazione*, Mr Justice Arnold later retreated from this notion suggesting a *sui-generis* AI legislation. See also Richard Arnold, *Performers' rights and recording rights: UK law under the Performers' Protection Acts 1958-72 and the Copyright, Designs and Patents Act 1988* (ESC Publishing, 1990).
[743] Bently & Sherman, *supra* note 406 at 116-7. *CDPA*, s 9(3) acts as an exception to the originality criteria. We can come to the same conclusion from a different path: under UK copyright law, establishing originality can be satisfied if the author has created the work using his/her own skill and judgment and the work originated with the author and was not copied. See *Ladbroke v William Hill*, [1964] 1 All ER 465 at 469 and *University of London Press Ltd v*

UK approach to computer-generated works is very different from the EU copyright law. Bently and Sherman note that difficulties arise with upholding originality criteria in computer-generated works with regards to cases lacking a relationship between author and creation.[744] Emily Dorotheou observes that although the UK courts have dealt with computer-assisted/generated works, they "have not yet considered a case regarding the author of computer generated works",[745] and when they do need to address computer-generated issues, they tend to gloss over the discussion rather quickly. One example is the case of *Nova v Mazooma*. In *Mazooma*, Nova argued that Mazooma games copied the composite frames which appeared on the screen.[746] However, Kitchin L. J. held that there was no infringement by concluding that the output of the computer-generated work belongs to the games' designer "because he devised the appearance of the various elements of the game and the rules and logic by which each frame is generated and he wrote the relevant computer program."[747]

The UK approach to originality exemplifies the difficulties of considering AI for copyright protection. Given the current definition of computer-generated works in the UK, I believe there are two possible routes for allocating protection to AI works under UK copyright law. First,

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University Tutorial Press, [1916] 2 Ch 601 at 609. See also Bently & Sherman, *ibid* at 96-98; Dorotheou, *supra* note 423 at 86. Thus, it is highly likely that any AI work (including most computer-generated works) will satisfy the current UK standard for originality.

744 Bently & Sherman, *ibid* at 117: "One possible test would have been to ask whether the work was produced as a result of the independent acts of the computer … Alternatively, a court might have said that originality exists where the computer has produced a work that is different from previous works … [I]f the same work had been generated by a human author, would it have required the exercise of a substantial amount of skill, labour, and effort? If so, then the computer-generated work would be original."

745 Dorotheou, *supra* note 423. According to Dorotheou, *Express Newspapers*, *supra* note 728, is the only case that has discussed computer-generated work in the UK.

746 *Nova Productions v Mazooma Games*, [2006] EWHC 24 (Ch (Eng)). An appeal to the UK High Court was failed. *Nova Productions v Mazooma Games*, [2007] EWCA Civ 219 (Eng).

747 *Nova Productions [2006]*, *ibid* at para 105. Kitchin L. J. further expresses his opinion against users or players rights to claim authorship in the program's output stating at para 106: "The player is not, however, an author of any of the artistic works created in the successive frame images. His input is not artistic in nature and he has contributed no skill or labour of an artistic kind. Nor has he undertaken any of the arrangements necessary for the creation of the frame images. All he has done is to play the game."

establish a new legal model for AI works. Under this model, the *CDPA* could define AI for the purposes of copyright and apply the same standard from computer-generated works. Alternatively, the UK can devise a new model for the allocation of rights. Secondly, UK copyright law might be willing to allocate rights by changing the definition of an author (*i.e.*, the personhood requirement).

While the copyrightability of computer-generated works in the UK is (relatively) clear, the EU position "is considerably less favourable towards ownership of computer works"[748] – let alone AI generated works – casting doubt on any prospect of AI works copyright protection. In most EU countries, copyright laws do not deal with computer-generated works. Since there are no exceptions to computer-generated works, the basic principles – personhood and originality – apply. For example, the *German Copyright Act* (Urheberrechtsgesetz, UrhG) establishes that only a human can be regarded as an author.[749] Thus, even when a work was created with a computer (*i.e.*, computer-generated), the courts still have to decide if the work is original.[750]

Article 1(3) of the EU *Computer Programs Directive* states: "A computer program shall be protected if it is original in the sense that it is the author's own intellectual creation."[751] Since there is no definition for originality in the EU's directives and regulations, the European Court of Justice (ECJ) had to provide guidance. There are several cases in which the ECJ shaped the boundaries of originality and, in the process, established what EU copyrightability is.

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748 Guadamuz, *supra* note 422 at 177.

749 Art 7 states: "The author is the creator of the work." Art 11 states: "Copyright protects the author in his intellectual and personal relationships to the work and in respect of the use of the work. It shall also serve to ensure equitable remuneration for the use of the work."

750 Jane Ginsburg, "The Concept of Authorship in Comparative Copyright Law" (2003) 52 DePaul L Rev 1063 [Ginsburg, The Concept of Authorship]; Eleonora Rosati, *Originality in EU Copyright: Full Harmonization through Case Law* (Cheltenham, UK: Edward Elgar, 2013) (Rosati identifies at least four different standards that are in use in the EU). As I will further explore in the next part, the originality standard proves to be the new *Tower of Babel* with every jurisdiction sharing a different vision. Bently & Sherman, *supra* note 406 at 117, offer a solution: "[T]here is no reason why such production could not be protected by related rights or unfair competition law."

751 *Software Directive*, *supra* note 641.

In *Infopaq International A/S*, the ECJ held that a work must be the result of the author's intellectual creation.[752] In *Eva-Maria Painer*, the court elaborated that an intellectual creation must reflect the author's personality.[753] Advocate General Trstenjak further offers that "*only human creations* are therefore protected, which can also *include those for which the person employs a technical aid*, such as a camera."[754] Finally, in *Football Dataco* decision,[755] the ECJ ruled that in "the setting up of a database, that criterion of originality is satisfied when, through the selection or arrangement of the data which it contains*, its author expresses his creative ability in an original manner* by making free and creative choices."[756] To put it briefly, the originality standard, as developed by the EU, makes a strong indication that a human author requirement is vital to establish copyright.[757]

It seems, however, that the EU is at least aware of the difficulties computer-generated/AI

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[752] *Infopaq International A/S v Danske Dagblades Forening*, C-5/08, [2009] EUECJ at para 37 & 39: "In those circumstances, copyright within the meaning of Article 2(a) of Directive 2001/29 is liable to apply only in relation to a subject-matter which is original in the sense that it is its author's own intellectual creation … In the light of the considerations referred to in paragraph 37 of this judgment, the various parts of a work thus enjoy protection under Article 2(a) of Directive 2001/29, provided that they contain elements which are the expression of the intellectual creation of the author of the work." See also Christian Handig, "The Copyright Term 'Work' – European Harmonisation at an Unknown Level" (2009) 40:6 Intl Rev Ind Prop & C'right LL 665 at 668.

[753] *Eva-Maria Painer v Standard VerlagsGmbH*, C-145/10, [2011] ECDR 6 at para 99: "In the light of the foregoing, the answer to the fourth question is that Article 6 of Directive 93/98 must be interpreted as meaning that a portrait photograph can, under that provision, be protected by copyright if, which it is for the national court to determine in each case, such photograph is an intellectual creation of the author reflecting his personality and expressing his free and creative choices in the production of that photograph. Since it has been determined that the portrait photograph in question is a work, its protection is not inferior to that enjoyed by any other work, including other photographic works."

[754] [Emphasis added]. Opinion of Advocate General Trstenjak on *Eva-Maria Painer v Standard VerlagsGmbH*, C-145/10 (12 April 2011) para 121, online: <curia.europa.eu/juris/document/document.jsf?text=&docid=82078&pageIndex=0&doclang=en&mode=lst&dir=&occ=first&part=1&cid=87400>.

[755] *Football Dataco Ltd v Yahoo! UK Ltd*, C-604/10, [2012] ECDR 7.

[756] [Emphasis added]. *Ibid* at para 38. The ECJ concluded at paras 43-44: "in the light of the factors set out above, whether the football fixture lists in question in the main proceedings are databases which satisfy the conditions of eligibility for the copyright protection set out in Article 3(1) of Directive 96/9. In that respect, the procedures for creating those lists, as described by the referring court, if they are not supplemented by elements reflecting originality in the selection or arrangement of the data contained in those lists, do not suffice for the database in question to be protected by the copyright provided for in Article 3(1) of Directive 96/9."

[757] See e.g. *Infopaq International A/S*, *supra* note 752 and *Bezpečnostní softwarová asociace - Svaz softwarové ochrany v Ministerstvo kultury*, C-393/09, [2011] ECDR 3; Handig, *supra* note 752.

works pose. I have already mentioned earlier the *EU Parliament Resolution Concerning Civil Law Rules on Robotics*.[758] In the explanatory part, the resolution addresses the challenges AI pose to copyright calling "to come forward with a balanced approach to intellectual property rights when applied to hardware and software standards and codes ... [and that] the elaboration of criteria for 'own intellectual creation' for copyrightable works produced by computers or robots is demanded."[759]

The UK's and EU's approaches to computer-generated creations reflect a conservative perception of copyright protection. This perception is understandable in the context of European copyright development from the theory of Romantic-individualistic human authorship. US and Australia, however, deal with computer-generated works differently.

In the US, legal policy towards computer-generated works since CONTU remains unchanged and is relatively clear and straightforward – a computer-generated work might be considered a work under copyright law; however, the computer itself cannot be regarded as the author.[760] As CONTU held:[761]

> *"The eligibility of any work for protection by copyright depends not upon the device or devices used in its creation, but rather upon the presence of at least minimal human creative effort at the time the work is produced."*

The author of a computer-generated work is the "one who employs the computer".[762] The US Copyright Office has recited these statements recently, following the Monkey Selfie case[763]

[758] EU Parliament Report, *supra* note 185.
[759] *Ibid* at 21.
[760] Pamela Samuelson, "CONTU Revisited: The Case Against Copyright Protection for Computer Programs in Machine-Readable Form" (1984) 1984 Duke L J 663 [Samuelson, CONTU Revisited].
[761] CONTU, *supra* note 621 at chapter 3 (New Works).
[762] *Ibid*. CONTU is well aware of the problem that these scenarios might result, such as when there are number of people involved in the process. See also Samuelson, CONTU Revisited, *supra* note 760 at 1193-4.
[763] See further, *supra* note 808.

clarifying that it would only register works created by a human being.[764] Bridy further explains that under the current legal framework in the US the law "cannot vest ownership of the copyright in a procedurally generated work in the work's author-in-fact, because the work's author-in-fact – a generative software program – has no legal personhood."[765]

As for the originality criteria, the standard was established in *Feist Publications*.[766] In rejecting the UK's low "sweat of the brow" standard, SCOTUS stated that "100 uncopyrightable facts do not magically change their status when gathered together."[767] Finally, SCOTUS held that for a work to be protected it requires some level of creativity.[768] The US standard for originality "stands in stark contrast to the Infopaq standard prevalent in Europe,[769] as in Feist the Supreme Court clearly reckons that selection, co-ordination and arrangement of information is not an act that conveys originality, while the opposite is true across the Atlantic."[770]

The *Feist* decision excludes computer-generated and AI works on the grounds that mechanical or routine acts lack creativity.[771] Computer-generated/AI works are based on algorithm

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[764] See above, *supra* note 422. Julia Dickenson, Alex Morgan & Birgit Clark, "Creative Machines: Ownership of Copyright in Content Created by Artificial Intelligence Applications" (2017) 39 EIPR 457 at 457-8.
[765] Bridy, *supra* note 423 at 51. See also *Penguin Books USA Inc v New Christian Church of Full Endeavor Ltd,* 288 F Supp (2d) 544 (City of NY 2000). Timothy L Butler, "Can a Computer be an Author? Copyright Aspects of Artificial Intelligence" (1982) 4 Comm & Ent LJ 707 at 746. Butler suggests creating a "presumption of a fictional human author" for AI works: "This interpretation would enable courts to presume authorship in AI product situations and allow time for analyzing the other requirements of the Act to determine copyright availability in a given situation. If all copyright requirements were met, then the policy goals of copyright would adequately be served because protection would be granted." Guadamuz, *supra* note 422 at 181, rejects Butlers' suggestion arguing that "[w]hile it is tempting advocate such a test, this would unfortunately incorporate a qualitative test into copyright that it currently lacks. Judges would have to be asked whether a text, a song or a painting are the product of a human or a machine."
[766] *Feist*, *supra* note 440.
[767] *Ibid* at 1287.
[768] [Emphasis added]. *Ibid* at 1294. As stated: "Originality requires only that the author make the selection or arrangement independently (*i.e.*, without copying that selection or arrangement from another work), and that it display some minimal level of creativity."
[769] *Infopaq International A/S*, *supra* note 752.
[770] Guadamuz, *supra* note 422 at 181.
[771] *Feist*, *supra* note 440 at 1296: "The question that remains is whether Rural selected, coordinated, or arranged these uncopyrightable facts in an original way. As mentioned, originality is not a stringent standard; it does not require that facts be presented in an innovative or surprising way. It is equally true, however, that the selection and arrangement of facts cannot be so mechanical or routine as to require no creativity whatsoever. The standard of originality is low, but it does exist."

codes and mechanical arrangements and thus might be considered routine acts in which originality is not subsisted. On the other hand, with machine-learning and deep-learning capabilities, it might be difficult to argue that computer-generated programs work according to a routine since the basis for the codes is to develop new and innovative ways to achieve their goals. The unpredictability of these systems is what caused unrest in the past.[772]

Australian copyright law provides little explanation of the term "author".[773] Section 10(1) defines an author only "in relation to a photograph" by stating that an author is "the person who took the photograph."[774] The common wording of section 9(3) of the *CDPA*, which was adopted in other UK colonies, is oddly missing. Therefore, an AI program which takes photos will not own copyright in the photos, even if the owner of the AI program is a person since the AI itself *took* the photos and not the person (owner of the AI program). Given that the Australian *Copyright Act* relies on the existence of a person for authorship, allocating copyright protection for computer-generated or AI works seems challenging, even without establishing originality.[775]

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[772] A good example is the decision to shut down Facebook's AI chatbot program that created its own language. Andrew Griffin, "Facebook's Artificial Intelligence Robots Shut Down After They Start Talking to Each Other In Their Own Language" (31 July 2017), online: *Independent* <independent.co.uk/life-style/gadgets-and-tech/news/facebook-artificial-intelligence-ai-chatbot-new-language-research-openai-google-a7869706.html>. Another example for creativity is the AI algorithms that beaten the top Chinese GO player in a move that no human anticipated. Samuel Gibbs, "AlphaZero AI Beats Champion Chess Program After Teaching Itself in Four Hours" (7 December 2017), online: *The Guardian* <theguardian.com/technology/2017/dec/07/alphazero-google-deepmind-ai-beats-champion-program-teaching-itself-to-play-four-hours>.

[773] Jani McCutcheon, "Vanishing Author in Computer-Generated Works: A Critical Analysis of Recent Australian Case Law" (2012) 36 Melbourne UL Rev 915 at 934.

[774] The Australian *Copyright Act* does not define a "person". However, the term is defined in the *Acts Interpretation Act 1901* (AU), 2C(1): "In any Act, expressions used to denote persons generally (such as 'person', 'party', 'someone', 'anyone', 'no-one', 'one', 'another' and 'whoever'), include a body politic or corporate as well as an individual." 2C(2) further provides: "Express references in an Act to companies, corporations or bodies corporate do not imply that expressions in that Act, of the kind mentioned in subsection (1), do not include companies, corporations or bodies corporate."

[775] As the 1998 Copyright Law Review Committee (CLRC) expressed: "While a majority of the Committee recognises there is an ongoing need for copyright legislation to connect a work with a human, it is concerned that the current requirement of 'authorship' may preclude the grant of protection to material that is deserving of protection, simply because the extent to which a computer was utilised in its creation exceeds a particular (currently uncertain) level." AU, Copyright Law Review Committee, *Simplification of the Copyright Act 1968 — Part 2: Categorisation of Subject Matter and Exclusive Rights, and Other Issues* (Canberra: The Committee, 1999) at 47–8 (5.10).

Further, in cases such as *IceTv v Nine Network Australia*[776] and *Telstra Corporation v Phone Directories Company*,[777] Australian courts have chosen a similar path to SCOTUS in adopting a higher originality standard, stating that skill and labour is not enough. *IceTv* and *Nine Network* show us that a higher originality standard often has adverse effects on the possible copyrightability of computer programs output.[778] These cases might prove a barrier to computer-generated works. However, as I have stated in regard to the US standing in this matter, it would be hard to argue in the future that machine-learning programs are not original, putting more pressure on the need to revisit copyright standards.

Unfortunately, there is no explicit reference in Canada's *Copyright Act* to computer-generated works, and copyrightability determines according to the well-established standard of originality, as developed by the courts.[779] The situation in Canada is a bit more complex though. Unlike other common-law jurisdictions with low to medium originality threshold (where creativity is less evident in determining originality), Canada did not adopt section 9(3) (computer-generated) provision. In other words, computer-generated works are more likely to be considered original under the *Copyright Act* and given that there is no specific exception to computer-generated works,

[776] *IceTV Pty Limited v Nine Network Australia Pty Limited*, [2009] HCA 14.
[777] *Telstra Corporation Limited v Phone Directories Company Pty Ltd*, [2010] FCA 44.
[778] Guadamuz, *supra* note 422 at 184. *IceTV*, *supra* note 776, produced an electronic program guide to its subscribers by gathering information from Nine Network (the broadcaster). The Australian High Court held, at para 54, that "the critical question is whether skill and labour was directed to the particular form of expression of the time and title information, including its chronological arrangement. The skill and labour devoted by Nine's employees to programming decisions was not directed to the originality of the particular form of expression of the time and title information. The level of skill and labour required to express the time and title information was minimal. That is not surprising, given that, as explained above, the particular form of expression of the time and title information is essentially dictated by the nature of that information." Similarly, in *Telstra*, *supra* note 777 at para 340, the court held that "[n]one of the Works were original. None of the people said to be authors of the Works exercised 'independent intellectual effort' or 'sufficient effort of a literary nature' in creating the Works. Further, if necessary, the creation of the Works did not involve some 'creative spark' or the exercise of the requisite 'skill and judgment'. I accept that production of the directories is a large enterprise populated by many contributors (ignoring for the moment the determinative difficulties with authorship outlined above). Many of the witnesses gave evidence that was direct and appropriate, and I accept that they work hard in their respective capacities."
[779] Mark Perry & Thomas Margoni, "From Music Tracks to Google Maps: Who Owns Computer-Generated Works?" (2010) 26:6 Computer L & Sec Rev 621. I will develop the originality discussion in Part III.

it is more difficult to negate the possibility of computer-generated authorship under the current *Copyright Act*.[780]

The distinction between a computer-generated and computer-assisted works was considered in a recent Albertan case, *Geophysical Service Incorporated (GSI) v Encana Corporation*.[781] GSI is an intriguing example of a courts' reaction to works of software created by minimal to no human influence. Such a reaction often manifests itself from a desire to find sufficient factual bases for human impact – slight as it may be – to allow a court to use the resulting legal arguments and bypass having to deal with non-human authorship, at least temporarily.[782]

In *GSI*, an Alberta court considered if collected and processed seismic data constitute a work protectable by Canadian copyright law.[783] The issue was if the work was computer-generated (with no – or negligible – human involvement) or computer-assisted (as described above, like an execution-facilitating tool). The court rejected the defendant's argument "that seismic data is created with 'little if any human input',"[784] distinguishing between its own case and *Telstra*.[785] Unsurprisingly, the court in *GSI* found that "human input is involved continuously through [the data's] acquisition stage."[786] The court contrasted *Telstra* to *GSI* by noting the degree of human

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780 Although this scenario is unlikely. I share Perry & Margoni view that: "[T]he impression left by the SCC that it was thinking exclusively in human activities, even without mentioning them, permeates the whole decision."

781 *Geophysical Service Incorporated v Encana Corporation*, 2016 ABQB 230, [2017] AWLD 4580 [*GSI*]. Leave to appeal to the SCC was denied.

782 Given the current legal status of non-human creation, if the court were to find that this work was created solely by a computer it might not considered it to be a "work" under copyright law, which would effectively leave the creation under the public domain for everyone to use.

783 *GSI*, *supra* note 781 at para 1. In *GSI*, a geophysical company, Geophysical Services Incorporated, "conducted offshore marine seismic surveys in the Canadian Atlantic and Arctic." GSI argued, among other claims, for copyright protection of the seismic material that was deposited with Canadian and Provincial government authorities. *GSI*, *ibid* at para 88. The court asked whether copyright subsists in a "work which is created by a computer with little if any human input."

784 *Ibid* at para 89.

785 *Telstra*, *supra* note 777. In *Telstra*, "the process was mechanical and involved little human input," so the Australian court concluded, that "the computers virtually took over all the necessary decisions involving skill and judgment"; *GSI*, *ibid* at para 90. For an interesting discussion in Australia see Alexandra George, "Reforming Australia's Copyright Law: An Opportunity to Address the Issues of Authorship and Originality" (2014) 37 UNSW 939.

786 *GSI*, *ibid* at para 89.

intervention required (particularly the "expert scientific skill and judgment […] 'tailored and unique' to the author"), and it determined that the works in question were human-authored (and therefore, merely computer-assisted).[787]

GSI foreshadows a likely trend in computer-generated cases: courts shuffling facts to find enough human ingenuity enabling a work – despite strong evidence of minimal-to-zero human influence – to establish human-authorship within the "safe haven" of computer-assisted works. Obviously, in the realm of computer-generated or AI works, human connection can always be established because humans contributed to the development of the programs and the computer technology. This may not always be sound legal policy. Computer-generated and computer-assisted works will likely become harder to differentiate. As a result, courts may view computer-generated works more as computer-*automated* works (establishing that humans influenced the work or instructed the program by any mean and thus the work is still affected by humans). Even though such a conclusion is not false from legal and philosophical perspectives, it seems to sidestep another more accurate truth: that the work is computer-*generated*.

Even if one jurisdiction should decide to grant copyright protection to AIs, are other jurisdictions obligated, under international agreements, to protect AI's creations as well? Can a state designate anyone or anything as an author?[788] The scope of legal protection was always considered a challenging one. As Vaver noted more than three decades ago: "Some countries, typically net exporters of copyright material such as the United States, have no hesitation … extending its benefit for all works and all rights to nationals or domiciliaries … [while others]

[787] *Ibid* at para 91.

[788] Vaver reflected about this question in his 1986 paper, asking: "(a) What 'works' qualify for national treatment? ... (b) What 'rights' must be given national treatment?" David Vaver, "The National Treatment Requirements of the Berne and Universal Copyright Conventions [Part 1]" (1986) 17 Intl Rev Ind Prop & C'right L 577 at 580 [Vaver, The National Treatment Requirements of Berne].

carefully weigh whether to extend protection."[789]

The scope of protection has a significant effect on a country's developments and economic growth.[790] There is no doubt that these considerations would impact the development of AI and thus it is important to further deliberate on the relations between the international treaties and obligations and the state. It is apparent, however, that under the *Berne Convention* there is a consensus that all states are obligated to impose minimum standard of protection. However, "the precise nature of the works protected and the rights granted are by and large left to a state's legislative discretion."[791]

In that context, we should inquire what the minimum requirements and obligations that can be establish under the international agreements are. As Vaver observes, "The works included within the RBC [revised *Berne Convention*] and the rights attaching to them … have been progressively enlarged since the original BC [*Berne Convention*]."[792] In reflecting on the balance between the international and state level, Vaver offers further that "[t]heoretically, the RBC is not supposed to compromise a state's internal affairs … however, in practice the RBC does oblige a state to extend protection to such works, since it is unthinkable that foreign authors should obtain a larger protection in a state than do the state's own nationals."[793]

Contrary to the American and Australian positions, *Berne* "seems neutral on the possibility of non-human authorship."[794] As Miller argues, *Berne* leaves Article 1's "authors" undefined.[795]

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789 *Ibid* at 578.
790 *Ibid* at 579.
791 *Ibid* at 586.
792 *Ibid*.
793 *Ibid*.
794 Berne, *supra* note 565; Miller, *supra* note 59 at 1050.
795 Miller, *ibid* at 1050; Vaver, The National Treatment Requirements of Berne, *supra* note 788 at 592. For a different view see Sam Ricketson, "People or Machines? The Berne Convention and the Changing Concept of Authorship" (1991) 16 Colum.-VLA J L & Arts 1 at 21-2. Ricketson argues that Berne "follows logically that the author should be a natural person." Ricketson further explains that "[a]part from the internal support to be found for this proposition

Both the *WCT* and the *TRIP*s dodge the issue by relying instead on *Berne* for guidance.[796] Vaver, on the other hand, holds a somewhat different view in stating that although *Berne* does not define an author "it has always had a well-recognised meaning" of the author as a natural person.[797] Vaver adds that under *Berne* an author "implies a person who applies his/her personal creativity."[798] Establishing a common ground for authorship has proved difficult given the divergence of the *Berne* signatories: "[S]ome recognising only natural persons as authors, while others treat certain legal entities as copyright owners, some imposing conditions for the recognition of authorship which others do not accept."[799]

The intriguing question is whether a state can define an author in a way that includes computer-generated or AI. Obviously, any jurisdiction has its own prerogative to shape its laws; however, a state "cannot compel another … state to accept its idiosyncratic meaning to the extent that it departs from the international law significance of the term."[800] Given the international obligations to protect the works of each sate under the convention, these changes might impose

within the Convention, in particular the moral rights provision in article 6bis, this theme is the *leitmotiv* running through all the categories of works presently protected by the Convention. With the arguable exception of cinematographic works, each protected type of work seems to be quintessentially the production of a human creator." Jane Ginsburg has recently commented on Ricketson's paper arguing that "because lack of human authorship would disqualify such outputs from Berne subject matter under Art. 2, other Berne members incur no obligation to protect purely computer-generated works even if their countries of origin choose to cover them by copyright." See Jane Ginsburg, "People Not Machines: Authorship and What It Means in the Berne Convention" (2018) 49 IIC 131 at 134-5 [Ginsburg, People Not Machines].

796 The *WCT*, *supra* note 637 at art 4 states that "computer programs are protected as literary works within the meaning of Article 2 of the Berne Convention. Such protection applies to computer programs, whatever may be the mode or form of their expression." Similarly, art 10(1) of the *TRIP*s, *supra* note 567, states that "computer programs, whether in source or object code, shall be protected as literary works under the Berne Convention." See also Michael L Doane, "TRIPS and International Intellectual Property in an Age of Advancing Technology" (1994) 9 Am U J Int'l L & Pol'y 465 at 489.

797 Vaver, The National Treatment Requirements of Berne, *supra* note 788 at 592-3.

798 *Ibid* at 594.

799 *GUIDE to the BERNE CONVENTION for the Protection of Literary and Artistic Works (Paris Act, 1971)* (Geneva: World Intellectual Property Organization, 1978) at 11. Unless their title is derivative from a human author.

800 Vaver, The National Treatment Requirements of Berne, *supra* note 788 at 594. As Vaver further provides: "A state cannot include in the term something that does not belong there, any more than it can exclude something that obviously does." *Ibid* at 595.

difficulties.

It seems that any decision to change the core concepts of copyright and IP must acknowledge the international agreements – a state is not entirely free to provide its views to the question of who is the author: “[T]he meaning of the term ‘author’ must be derived from and regulated by the RBC, not by the meaning an individual state chooses to place on the term.”[801]

Despite their obvious differences, none of the copyright regimes of the US, the UK, Australia, Canada or the EU are willing to accept computer-generated or AI as the author of a given work. Courts might, however, adopt a different approach to authorship in the future and could resolve such issues by relying on other legal doctrines and fields.[802]

AI creations are computer-generated works, but not every computer-generated work can be considered an AI creation. Being considered for AI copyright protection should require an assertion that AI created the work; not every sophisticated computer can be defined as AI for copyright protection purposes. The current debate around computer-generated works allows us to understand better the legal standing and “neighbourhood” in which the idea of allocating copyright to computer or AI creations has been developed. It seems that the legal community has not come to terms with the question of awarding rights to creations in which a connection between the author-programmer and the work cannot be established, or the connection is too remote in time or function.

As with copyright, our current legal system’s non-recognition of computer-generated inventions creates eligibility issues for patent protection. Ryan Abbott refers to this ambiguity in

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[801] *Ibid* at 592.
[802] I disagree with this view. In developing legal theory, we should aspire to create holistic doctrines applicable to different scenarios, and not limit our scope of protection to humans.

claiming that "it is not clear that a computer could be an inventor or even that a computer's invention could be patentable."[803] As with copyright, "there is no statute addressing computational invention, no case law directly on the subject, and no pertinent Patent Office Policy."[804] Further, since neither patent (nor copyright) laws recognize computers as inventors,[805] failing to name a human as inventor or designate a computer as the sole inventor can result in a denial of patenting or an invalid or unenforceable patent.[806]

Abbott argues for amending patent law to consider computers as inventors. He believes that "there should be no requirement for a mental act because patent law is concerned with the creativity of an invention itself rather than the subjective mental process by which an invention

[803] Abbott, *supra* note 656 at 1080. See also Ralph D Clifford, "Intellectual Property in the Era of Creative Computers Program: Will the True Creator Please Stand Up?" (1997) 71 Tul L Rev 1675 at 1702-3; Samuelson, *supra* note 423 at 1199-1200, stating that "[t]he system has allocated rights only to humans for a very good reason: it simply does not make any sense to allocate intellectual property rights to machines because they do not need to be given incentives to generate output. All it takes is electricity (or some other motive force) to get the machines into production. The whole purpose of the intellectual property system is to grant rights to creators to induce them to innovate." I disagree with Samuelson on those pointes. First, as I have explained in this part, IP laws do more than create incentives. Second, machines might be able to respond to incentives in the future, and even if machines would not be able to, as Abbott suggested, there might be other reasons to designate machines as inventors.
[804] Abbott, *ibid*. See Ben Hattenbach & Joshua Glucoft, "Patents in an Era of Infinite Monkeys and Artificial Intelligence" (2015) 19 Stan Tech L Rev 32 at 44.
[805] Abbott explains: "All patent applications require one or more named inventors who must be 'individuals', a legal entity such as a corporation cannot be an inventor." Abbott, *ibid* at 1092.
[806] Abbott, *ibid* at 1087-9, provides several examples for patents that were created by computers autonomously. The first is the Creativity Machine. Dr. Stephen Thaler stated that the Creativity Machine, which invented "his" second patent – "Neural Network Based Prototyping System and Method" – was listed as the inventor for the purpose of registering the patent. Another example for computer-generated patent is the Genetic Programming (GP), a software molded after the process of biological evolution. According to Abbott, the GP might be responsible for creating at least two patentable new inventions. In one case, the patent office had granted patent for a computational invention on Jan 25, 2005, that was created by the "Invention Machine" – a GP based AI developed by Dr. John Koza. In a 2006 paper, Dr. Koza claimed that the Invention Machine is in fact the sole inventor. The third example Abbott provides is the IBM famous AI computer system – Watson. Watson is a different brand of Invention Machines, since it "utilizes a more conventional architecture of logical deduction combined with access to massive databases containing accumulated human knowledge and expertise." By applying a new developed algorithm that "incorporated a database with information about nutrition, flavor compounds, the molecular structure of foods, and tens of thousands of existing recipes", Watson can, theoretically, create new processes and combinations that could qualify as patentable subject matter. In a more recent paper, Abbott describes Watson contribution to research in identifying "novel drug targets and new indications for existing drugs." Abbott concludes that "Watson may be generating patentable inventions either autonomously or collaboratively with human researchers." See Ryan Abbott, "Everything is Obvious", 66 UCLA L Rev [forthcoming in 2019] at 20, online (draft): <conferences.law.stanford.edu/werobot/wp-content/uploads/sites/47/2018/02/Everything-is-Obvious_1_31_18.pdf> [Abbott, Everything is Obvious].

may have been achieved."[807] This makes sense for the AI copyright discussion and accords for other non-human creators. As Abbott suggests: "The need for computer inventorship also explains why the Copyright Office's Human Authorship Requirement is misguided. Nonhumans should be allowed to qualify as authors because doing so would incentivize the creation of new and valuable creative output."[808] Shlomit Yanisky-Ravid and Xiaoqiong (Jackie) Liu have expressed a different view. They oppose creating "new legal personalities to whom such ownership rights could be granted" and contend that patent law is not applicable to AIs.[809]

The Canadian *Patent Act* seems to echo US law in this matter. Although "inventor" is not mentioned in the *Constitution Act* or defined in the *Patent Act*, other statements imply a human criterion.[810] Patentee, for example, "means the *person* for the time being entitled to the benefit of a patent."[811] With the developments in the field, I can only predict that the CPO will face similar concerns.

2.3.3 The Future: IP Implications for Future Developments

In earlier chapters, I presented – past and present – challenges reflecting on how software developments affected or are affecting IP law. I have showed how IP law is fluctuating and adapting to technological changes in a never-ending struggle to balance between different IP fields,

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807 Abbott, *ibid* at 1082.
808 *Ibid* at 1121. Abbott makes few other suggestions including arguing for recognizing animal authorship rights (citing *Naruto*, *supra* note 237, also known as the Monkey Selfie case) claiming that "[a]nimal authorship might also have some ancillary conservation benefits" such as creating incentives for endangers species (as the selfie monkey) to preserve the animals and creates biodiversity. This argument might sound appealing to the proponents of animal rights. However, the underline reasoning of the argument is based on public policy and not IP justifications. Recognizing individual rights for IP protection must include some level of awareness of the animal's contribution in the form of expected incentive, benefit or a certain connection to the creation. In *Naruto* it is hard to argue that the monkey was *aware* of his actions – creating a picture.
809 Yanisky-Ravid & Liu, *supra* note 293 at 2245-6.
810 Vaver, *supra* note 237 at 364.
811 *Patent Act*, RSC 1985, s 2. *Person*, under Canada *Interpretation Act*, RSC 1985, s 35(1) includes corporation – "person, or any word or expression descriptive of a person, includes a corporation." See also *Interpretation Act*, *ibid* at section 33(1). Consequently, it seems both animals and machines are excluded from the *Patent Act*.

as well as between IP and the public. In this chapter, I will address future developments and their IP applications. Lawrence Solum,[812] Lemley,[813] Abbott,[814] and others have debated on these expected developments. I will consider their research and add a few notions of my own.

Solum argues that technological developments are sometimes so profound that they may rock "the foundations of an entire body of law".[815] Solum proves his point by explaining the way new technology – like the video-tape recorder in *Sony*,[816] peer-to-peer (P2P) file sharing in *Napster*,[817] the Internet and the *Digital Millennium Copyright Act* (DMCA),[818] among other examples – morph the law.[819] Consequently, the future of copyright law "is up for grabs", and "we are in the midst of an intellectual, moral, and legal struggle over the future of copyright."[820] Solum's predictions are over a decade old, and though the examples he provided have since evolved (or become obsolete), the legal reasoning has not.

Technology's potential effect on current IP law was described recently by a group of researchers at the University of Edinburgh. They argued that "[w]e are moving into an era where man-machine co-production of creative works will become commercially viable and commonplace."[821] The issue, as they posed it, "is not 'high art' but rather more mundane forms of

812 Lawrence Solum, "The Future of Copyright" (2005) 83 Tex L Rev 1137 [Solum, The Future of Copyright], (reviewing Lawrence Lessig, Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity (2004)).
813 Lemley, IP in a World Without Scarcity, *supra* note 27. See also Mark Lemley, "Part VII Ready for Patenting" (2016) 96 BUL Rev 1171.
814 Abbott, *supra* note 656; Abbott, Everything is Obvious, *supra* note 806. See also Erica Fraser, "Computers as Inventors - Legal and Policy Implications of Artificial Intelligence on Patent Law" (2016) 13 SCRIPTed 305.
815 Solum, The Future of Copyright, *supra* note 812.
816 *Sony Corp*, *supra* note 440 at 428 (in *Sony* the court rejected the claims that the sale of tape recorders and photocopying machines constitute contributory infringement).
817 *A&M Records, Inc v Napster, Inc*, 239 F (3d) 1004 (9th Cir 2001).
818 Pub L No 105-304, 112 Stat 2860 (1998) (codified as amended in scattered sections of 17 USC).
819 Solum, The Future of Copyright, *supra* note 812 at 1138.
820 *Ibid* at 1139.
821 A Fourth Law of Robotics, *supra* note 6 at 225.

creativity, for example writing short new stories or short jingles for computer games."[822] And, these creations will probably be "disseminated automatically, without human intervention or oversight."[823]

It appears that computer-generated technology will become the standard. Human involvement in creation and invention processes (*i.e.*, patents and copyright) will decline in some areas. True, a humans' indirect effect will remain prevalent, since humans created the codes or algorithms leading to the work's invention's development; however, the connecting link between the original programmer (or the original code) and the creation will become more distanced.

Not only is the distance between human and creation increasing, so is the tremendous effect on human life by current and impending technologies. As Lemley recently noted, "new technologies promise to do for a variety of physical goods and even services what the Internet has already done for information."[824] Abbott echoes Lemley, predicting that "an innovation revolution is on the horizon."[825] Among these significant developments that can affect the shape of our laws in general and IP in particular: 3D printing, synthetic biology, bio-printing robotics,[826] genetic manipulation, drones, self-driving vehicles, virtual reality (VR) and augmented reality (AR).

3D printing is one of the most imminent and significant challenges to our current legal system.[827] IP is certainly *one* of the legal areas it affects, but not the only one. 3D technology and

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[822] *Ibid*.
[823] *Ibid*.
[824] Lemley, IP in a World Without Scarcity, *supra* note 27 at 461.
[825] Abbott, *supra* note 656 at 1079.
[826] Lemley, IP in a World Without Scarcity, *supra* note 27 at 461.
[827] In simple terms, 3D printing converts information into a physical form. By providing 3D printers the data (schematics) of any given structure, the printers can shape the structure accordingly. As Lemley further provides: "A typical 3D printer will use as input a form of extruded plastic. The user loads a blueprint into the computer attached to the 3D printer, and the printer deposits the plastic, layer by layer, until it has made a 3D object." Lemley, IP in a World Without Scarcity, *supra* note 27 at 471. See also Danton L Bryans, "Comment, Unlocked and Loaded: Government Censorship of 3D-Printed Firearms and a Proposal for More Reasonable Regulation of 3D-Printed

its implications pose challenges to broader areas such as public safety,[828] environment protection,[829] and even our taxation system.[830] Many IP legal scholars have offered different solutions to the so-called IP "threat". From prohibiting the distribution of 3D printers (a similar approach to that taken in *Sony* and *Napster*),[831] to providing free 3D printer access under fair-use or fair dealing for home users.[832]

Yanisky-Ravid and Kwan, for example, suggest adopting a DMCA-based model, imposing obligatory registration for 3D printers and other anti-circumvention features.[833] Lemley predicts (and hopes) that IP owners will lose that fight much as they lost the fight over internet file-sharing and streaming technology,[834] since "the potential social value in these new technologies, like the

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Goods" (2015) 90 Ind LJ 901 (2015); Daniel H Brean, "Asserting Patents to Combat Infringement via 3D Printing: It's No 'Use'" (2013) 23 Fordham IP Media & Ent LJ 771.

828 Printing guns and products that can pose risk such as health and safety risks.

829 Using raw materials that can endanger the environment.

830 Yanisky-Ravid & Kwan, *supra* note 178. Yanisky-Ravid and Kwan address several concerns that 3D technology poses to our society. In doing so, their research goes deeper and broader into the implications of 3D printing on other areas of the law.

831 The court in *Def Distributed v US Dep't of State*, 838 F (3d) 45 at 454-55 (5th Cir 2016), refused to enjoin regulation of CAD files that enable printing guns, implicitly endorsing a sweeping interpretation to the US free speech amendment. See "First Amendment - Technology - Fifth Circuit Declines to Enjoin Regulation of Online Publication of 3D-Printing Files - Defense Distributed v. United States Department of State, 838 F (3d) 451 (5th Cir. 2016)" (2017) 130 Harv L Rev 1744 at 1751. Yanisky-Ravid & Kwan, *ibid* at 947, further provide that "[o]pponents of 3D printing have argued that as 3D printers become widespread, peer-to-peer services will be flooded with CAD models, posing a similar threat to designers and manufacturers as Napster did to the entertainment industry." Some suggested making certain distributors liable for patent infringement, arguing that the "US patent law should be expanded to allow patent holders to sue CAD distributing websites directly for patent infringement." *Ibid* at 948. Others went as far as argue for banning 3D printing completely. See also Nicole A Syzdek, "Five Stages of Patent Grief to Achieve 3D Printing Acceptance" (2015) 49 USF L Rev 335.

832 As Yanisky-Ravid & Kwan, *supra* note 178 at 946 explain: "3D printing will usher in a new era of technology innovations, which will improve society's welfare in many ways, as anyone can become a creator, inventor, or manufacturer. 3D printing opens the door to a new wave of innovation being done from home, which can be carried out by individuals, start-ups, or large firms." See also Devan R Desai & Gerard N Magliocca, "Patents, Meet Napster: 3D Printing and the Digitization of Things" (2014) 102 Geo LJ 1691 at 1693.

833 Yanisky-Ravid & Kwan, *ibid* at 951: "The three core elements of our proposed reform are as follows. First, registration of 3D printers should be required. Second, 3D printers should be manufactured to contain an imprinting/stamping sign that enables the tracking of its products. Optionally, 3D printers can be manufactured to be inoperable unless the printers are connected to the Internet … Third, a repository should be provisioned to receive and store CAD models uploaded by intellectual property owners-these can be matched with models uploaded by users during 3D print requests to identify whether infringing models are being used."

834 Lemley, IP in a World Without Scarcity, *supra* note 27 at 499-500.

Internet, is enormous."[835]

I predict that the 3D printing market will implement a Netflix or iTunes model in which the public can subscribe for affordable access to copyright and designs. Admittedly, these suggestions may not resolve every public threat and legal problem posed by technology. But, given my assumption about dramatic changes in IP law's future – leading to a more democratic market that limits protection for authors and inventors – this model might eventually prevail.

Robotics,[836] an intriguing expected technological development, poses numerous legal and ethical challenges as well.[837] Even though the robotic industry is less advanced and the availability of robots for public use is currently limited,[838] the applications of robotics seem less futuristic than some would think. In the coming five to fifteen years, robots will be available for home users and "[s]pecial purpose robots will deliver packages, clean offices, and enhance security."[839] Further, there are several indications that robots for private users (*i.e.*, home services) will become more advanced and effective in the next fifteen years.[840] Within general robotics developments, robot assistants (*i.e.*, caregiver robots or "servants" like drivers, cleaners, or secretaries) may have significant legal implications, particularly for IP law.[841] At first, these robots might only serve as

[835] *Ibid* at 500.
[836] Although, robots do not form part of my research, they remain notable as AI's physical embodiment, since any robot may come equipped with an AI program.
[837] See Ronald Leenes et al, "Regulatory Challenges of Robotics: Some Guidelines for Addressing Legal and Ethical Issues" (2017) 9 L Innovation & Tech 1.
[838] "[T]echnical constraints and the high costs of reliable mechanical devices will continue to limit commercial opportunities to narrowly defined applications for the foreseeable future." See the 100 Year Study, *supra* note 22 at 7 and 24.
[839] *Ibid*. I include drones in these scenarios.
[840] *Ibid* at 25: "Despite the slow growth to date of robots in the home, there are signs that this will change in the next fifteen years. Corporations such as Amazon Robotics and Uber are developing large economies of scale using various aggregation technologies."
[841] A Fourth Law of Robotics, *supra* note 6 at 231.

companions,[842] but later robots could provide substantial assistance.

The challenges facing copyright law in robotics, and AI and machine-learning technologies, are complex and broad-reaching. Robots, by their intended purposes, are designed to store and share data that are likely protected by copyright. By programming robots to store data (pictures and other information stored on its "hard-drive" or uploaded to the "cloud"), robots (and their human owners) can infringe copyright with every picture, video, or piece of digital information they hold and process.[843] Consider, for example, a robo-caregiver following its visually impaired person in a museum. In order to fulfil its duties, the robo-caregiver will take images of the artworks hanging on museum wall (to move around or to direct the disabled person to her favourite art). Taking and storing photos the robo-caregiver's database, or sharing them with other robo-caregivers,[844] could constitute possible copyright infringement.[845]

Insofar as patent law is concerned, robots will presumably be mass-produced by companies aspiring to protect their inventions. Patenting robots, globally, seems as futile as trying to patent a car. So, the process would likely comprise trying to patent software and technology related to the robot's activities (like sensors, or voice and sound applications). Such attempts might still prove

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[842] See the "cat robot" that is designed to provide people that can't take care of a real animal the companion they need. Dave Lee, "Meet the robotic cat for the elderly" (15 January 2016), online: *BBC* <bbc.com/news/technology-35310200>.

[843] As Benkler, *supra* note 617 at 440 explains, in the US "[a]n early decision of the Ninth Circuit Court of Appeals, *MAI Systems*, treated RAM (random-access memory) copies of this sort as 'copies' for purposes of copyright. This position, while weakly defended, was not later challenged or rejected by other courts. Its result is that every act of reading on a screen involves 'making a copy' within the meaning of the Copyright Act. As a practical matter, this interpretation expands the formal rights of copyright holders to cover any and all computer-mediated uses of their works, because no use can be made with a computer without at least formally implicating the right to copy."

[844] As stated in the 100 Year Study, *supra* note 22 at 25: "Cloud ('someone else's computer') is going to enable more rapid release of new software on home robots, and more sharing of data sets gathered in many different homes, which will in turn feed cloud-based machine learning, and then power improvements to already deployed robots."

[845] A Fourth Law of Robotics, *supra* note 6 at 231-2. However, this statement might not be accurate to all jurisdictions and in all circumstances. For example, see section 60(2) of Canada's *Copyright Act*, RSC 1985, *supra* note 590 ("Radio performances in places other than theatres"). Also, the recent *Marrakesh Treaty* could be extended to support these scenarios as well. See M*arrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired or Otherwise Print Disabled*, WIPO Doc VIP/DC/8 (27 June 2013) [*Marrakesh Treaty*].

unsuccessful. First, as noted in the *Alice* discussion above, patent law is evolving to make software patenting more difficult. Second, codes or algorithms might develop rapidly. Since future technology will likely incorporate machine-learning capabilities, the results of which will be shared online instantaneously, it will be almost impossible to anticipate the development phase and block the codes from other robo-caregivers or similar technology.

Data and information will be crucial to robotics and AI despite copyright.[846] Much computer-generated content uses data that can be accessed from copyright-protected sources over the Internet, for example, to assist self-driving cars' sensors, or provide information to mobile phones' personal assistant (like Siri). These data comprise the building blocks for future progress, despite their collection perhaps constituting copyright infringement.[847] As I will further develop in Part III, resolving data barriers and providing access to high-quality data is essential for AI development. True, under current legal framework (at least in the US) the fair use doctrine makes it difficult to argue that a machine or robot has committed copyright infringement.[848] However, this approach may not endure much longer; as computers evolve, and with expected advancement in AI and machine-learning capabilities, legal reasoning will likely be reconsidered and change with it.

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846 As Burkhard Schafer opines: "The machine learning techniques on which [robots and AI technology] depend require massive amounts of input, data that can be subject to varying IP regimes. If the robot revolution is going to transform our economy, access to these inputs must be possible at an economically affordable cost - while at the same time, some data sets (or entire works) could acquire significant commercial value they were lacking in the past." Burkhard Schafer, "Editorial: The Future of IP Law in an Age of Artificial Intelligence" (2016) 13 SCRIPTed 284.
847 As James Grimmelmann expressed, "copyright has concluded that reading by robots doesn't count. Infringement is for humans only; when computers do it, it's fair use." James Grimmelmann, "Copyright for Literate Robots" (2016) 101 Iowa L Rev 658 [Grimmelmann, Copyright for Literate Robots].
848 The non-expressive fair use doctrine was first recognized in *Sega Enterprises Ltd v Accolade, Inc*, 977 F (2d) 1510 (9th Cir 1992). The Court ruled, *ibid* at 1527-8, that Accolade's reverse engineering of Sega's genesis console and games to copy the computer code that bridged between the console and the games is considered a non-expressive fair use, holding that "where disassembly is the only way to gain access to the ideas and functional elements embodied in a copyrighted computer program and where there is a legitimate reason for seeking such access, disassembly is a fair use of the copyrighted work, as a matter of law. Our conclusion does not, of course, insulate Accolade from a claim

Lemley and Eugene Volokh address other expected technological advancements and their legal implications: virtual reality and augmented reality. In VR, the user is placed in a virtual world, in which he or she can interact and move in a fictional environment; in an AR, the user can add elements to his reality.[849] VR and AR technology pose new problems for classic legal questions as well as for copyright,[850] one of which is using copyrighted images (*i.e.*, Superman, Lara Croft) as characters in the VR or AR world. Lemley and Volokh predict that copyright and trademarks suits against users that create avatars from copyrighted images "would likely operate much as they have now, though with many of the uncertainties we see now."[851]

The above are only a few examples; there are many more. This section's purpose was to provide a sample of technological challenges we are facing today and might face in the near future. Bridging the gap between the current legal system and the expected implications of future technology is a significant challenge. One might argue that these changes are no different from the industrial revolution or the Internet, and as with them, no great revolutionary legal paradigm shift should be expected. I disagree.

of copyright infringement with respect to its finished products. Sega has reserved the right to raise such a claim, and it may do so on remand."

[849] Lemley & Volokh, *supra* note 30.

[850] *Ibid* at 1055-6. As Lemley and Volokh explain: "Sorting out who is responsible will require courts to understand the technology and how it differs from the world that came before. But it won't necessarily require a fundamental rethinking of legal doctrines. A death threat via AR or VR is legally the same as a death threat via an oral conversation, a letter, an e-mail, or a fax."

[851] *Ibid* at 1111.

2.4 AI-IP THEORY - DISCUSSION

Will IP law be expected to change dramatically? or will its structure remain largely static with minor adaptations?[852] Legal history strengthens the latter: stasis. Why would an AI revolution depart substantially from the Internet revolution, where IP laws changed very little? And if IP laws will not change dramatically in these instances, when would we expect change at all?

Humanity has always expected the worst. Consider films from the 1980s and 90s like *Blade Runner* (1982) portraying 2019 Los Angeles as a dystopian city,[853] or *The Terminator* (1984) predicting humanity's destruction in the late 1990s by an AI program named Skynet.[854] And yet, LA and humanity remain intact, safe from AI's worst nightmares. This is not to suggest that the societal issues raised in those films are trivial and worth little consideration. Instead, I wish to emphasize that we tend to oversimplify or dramatize our legal and social predictions. Given the anticipated technological changes on the horizon, I argue that it is neither doctrinally correct nor normatively desirable to use our current IP legal framework to anticipate the expected developments; new and innovative thinking must be developed and advanced.

The goal of this chapter is twofold: first, discussing and exploring if one or more legal theories can recognize AI creations; second, returning to the theoretical discussion and considering if legal assumptions can adapt to recognize AI authorship or inventorship. The preliminary considerations discussed in the previous parts about AI personhood rights will remain

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[852] Guadamuz, for example, opined that "[c]opyright law clearly defines the author of a work as 'the person who created it'. Despite some recent legal disputes regarding monkeys and photographs, it is highly unlikely that we will witness any deviation away from personhood as a requirement for ownership, and we are not to witness any sort of allocation of rights towards machines and animals." See Guadamuz, *supra* note 422 at 173. Professor Alexandra George shared similar view in a recent conference in Singapore, online: <future-of-law-conference.com>.

[853] See "Blade Runner – Opening Titles (HQ)" (17 July 2012), online (video): *YouTube* <youtube.com/watch?v=-fu7jN2_2pE>.

[854] See "The Terminator (1984) Official Trailer - Arnold Schwarzenegge Movie" (25 August 2016), online (video): *YouTube* <youtube.com/watch?v=k64P4l2Wmeg>.

unchallenged. This debate assumes that we can allocate legal rights to AI, at least theoretically. And it starts by looking at the existing regime and seeing how to best distribute a limited bundle of rights to AI in the current state of technological progress with an eye towards what may come.

To start, the current IP regime should accommodate and anticipate the ongoing variable needs that various evolving levels of technology require. Right now – and for the next five to ten years – AI is unlikely to evolve to the point of exhibiting semi-human capabilities, even though it may eventually. We are more inclined in the near future to witness developments in computer-generated works: automated works created with minimal or no human involvement.

During this stage, the IP regime should change, adapt, exempt – or all three – to recognize and protect non-human creations, albeit within its existing framework and mechanisms.[855] Acknowledging the importance of strong user rights and the public domain, increasing IP protection is crucial for this stage of development. As Abbott highlights, the current IP regime is not serving the purpose it was designed for, and technological developments, especially with patents, will exacerbate IP's loss of theoretical identity.

Second, once independent AI creations develop over the next few decades, and as the human effect on AI output weakens, IP justifications will have to change and adapt too. When that occurs, AI's IP rights – which would be hypothetically recognized by this time – can be catered to by allocating specific rights to AI as the technological climate demands. The moral rights approach is but one conceivable way of doing this. Another is changing the IP regime to distinguish instead between humans and non-humans (as opposed to between humans and AI) for creations and inventions. I intend to explore several other alternatives like those incorporating doctrines of joint

[855] Abbott, *supra* note 656.

authorship, derivative works, and work made for hire; at the outset, however, I find them less than convincing.

Solum notes the different ways that IP scholars tried to address earlier technological developments, like peer-to-peer file sharing.[856] Posner and Landes[857] "propose indefinitely renewable copyrights."[858] Netanel and Fisher support legalize file-sharing,[859] and suggest "replac[ing] the lost revenues with a tax on hardware and internet service."[860] To address issues with copyright duration extension, Joseph Liu suggests considering time as a factor in fair use and fair dealing analyses.[861] In several papers, Lemley challenges IP justifications generally in a digital world that facilitates free duplication of IP-protected goods.[862]

These scholarly considerations demonstrate the need to re-evaluate the shape and scope of IP laws. What follows is a return to the IP justifications described at the outset of this part in chapter II.B, explored under the lens of AI-IP rights.

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[856] Solum, The Future of Copyright, *supra* note 812 at 1138.
[857] William M Landes & Richard A Posner, "Indefinitely Renewable Copyright" (2003) 70 U Chicago L Rev 471; Posner & Landes, The Economic Structure of IP, *supra* note 416.
[858] Solum, The Future of Copyright, *supra* note 812.
[859] Neil W Netanel, "Impose a Noncommercial Use Levy to Allow Free Peer-to-Peer File Sharing" (2003) 17 Harv JL & Tech 1; William W Fisher III, *Promises to Keep: Technology, Law and the Future of Entertainment* (Stanford: Stanford University Press, 2004) [Fisher, Promises to Keep].
[860] Solum, The Future of Copyright, *supra* note 812.
[861] Joseph P Liu, "Copyright and Time: A Proposal" (2002) 101 Mich L Rev 409.
[862] Mark A Lemley, "Ex Ante Versus Ex Post Justifications for Intellectual Property" (2004) 71 U Chicago L Rev 129 at 132; Lemley, IP in a World Without Scarcity, *supra* note 27. See also Barthes, *supra* note 531.

2.4.1 The Utilitarian Approach Justifies AI-IP Rights

IP under the utilitarian theory promotes innovation and intellectual productivity for society's "greater good." As such, allocating legal rights for AI adheres to Bentham's consequentialist reasoning if computer authorship is sufficiently incentivized to produce more innovation and intellectual output. Yet, computers are unrecognized by patents and copyright laws as inventors and authors, so AI inventions and works – no matter what value they produce for humankind – are not patented or copyrighted unless they are "directly influenced by humans authors [or inventors]."[863] This approach creates barriers "to inventorship for computers as well as people",[864] and goes against the utilitarian theory principles.

I argue that there is no legal justification to attribute patents or authorship to inventors or computer programmers who did not influence the production of the invention or creation. As Abbott further offers, "If a computer scientist creates an AI to autonomously develop useful information and the AI creates a patentable result in an area not foreseen by the inventor, there would be no reason for the scientist to qualify as an inventor on the AI's result."[865] Yanisky-Ravid echoes Abbott's argument: "[T]he creativity of an AI system is not a result of the creativity of the programmers; at the very least, the causal relationship is not close enough to justify ownership … in the new works generated by AI machines. The human programmer is only ancillary to the creation of the artworks."[866]

If a computer programmer created an AI for one specific purpose and the AI created an original work tangential or unrelated to that purpose, where is the justification to allocate the

[863] Hristov, *supra* note 422 at 436. See also Guadamuz, *supra* note 422.
[864] Abbott, *supra* note 656 at 1093.
[865] *Ibid* at 1095.
[866] Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 701.

programmer authorship rights? One might argue, under utilitarianism, that incentivizing more programmers to design AI programs will improve the odds that those programs produce useful creations, which in turn maximizes human benefit. This might be false logic, as explained through the following example of the innovative way machine learning is developing isolated from human intervention: the March 2016 Alpha Go match, in which a famous computer program defeated one of the top world Go players, Lee Sedol.[867] Not only did AlphaGo win, but it won in such an unpredictable fashion; AlphaGo's move 37 left the human players and programmers speechless.[868]

As AI advances, we should expect more creativity from AI programs, and as a result, more unpredictability. If computer programs create useful works and inventions at a greater but unpredictable rate, then it follows that we should not develop a legal system that discourages (or at least, fails to encourage) computer programs to be less creative and original by design.[869]

From a utilitarian perspective, promoting computer inventorship is desirable and should justify the rewards of IP protection. First, "the financial motivation it will provide to build creative computers is likely to result in a net increase in the number of patentable inventions produced."[870] In our current stage of development, the need for human involvement is artificial; in fact, humans influence few inventions at all. Amending patent laws to recognize computers as patent-eligible could motivate the scientific community to develop more programs that automatically produce inventions without worrying about the human inventor criterion. In many ways, this shift is not

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[867] See also Part I, footnote 148.
[868] Cade Metz, "In Two Moves, Alphago and Lee Sedol Redefined the Future" (16 March 2016), online: *Wired* <wired.com/2016/03/two-moves-alphago-lee-sedol-redefined-future>. Move 37 is explained in the article: "With the 37th move in the match's second game, AlphaGo landed a surprise on the right-hand side of the 19-by-19 board that flummoxed even the world's best Go players, including Lee Sedol. 'That's a very strange move,' said one commentator, himself a nine dan Go player, the highest rank there is. 'I thought it was a mistake,' said the other. Lee Sedol, after leaving the match room, took nearly fifteen minutes to formulate a response."
[869] See the text around footnote 647.
[870] Abbott, *supra* note 656 at 1108.

"revolutionary": it is only technical and just and could be designed in a way that leaves economic benefit to scientists or programmers as a transitional measure to maintain incentives to develop.[871]

I share Abbott's conclusion that "courts and policy makers should be guided first and foremost by the explicit constitutional [*i.e.*, incentive based] rationale for granting patents."[872] And, "allowing patents [and copyright protection] on computational inventions as well as computer inventors would do away with what is essentially a legal fiction – the idea that only a human can be the inventor of the autonomous output of a creative computer – resulting in fairer and more effective incentives."[873] Humanity should be willing to accept a certain level of AI personhood.

In copyright law, immense value exists in AI-Authorship and "without an established period of protection, there is no tangible incentive for developers of AI machines to continue creating, using, and improving their capabilities."[874] Several justifications exist for AI authorship in both the current stage of development and the future. And as with patents, our current developmental stage demands we extend legal protection to computer-generated works.

The next stage of AI development adds further concerns. Solum contends that the utilitarian idea of the "good life" is defined as maximizing pleasures and minimizing pain. Thus, the question is if AI can have interests, which equates with the question of whether AI can have or demonstrate

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[871] I agree that, in the current climate, scientists and computer programmers should retain economic rights from the computer's invention.
[872] Abbott, *supra* note 656 at 1108.
[873] *Ibid*.
[874] Hristov, *supra* note 423 at 438. Hristov further provides: "Simply put, even if programmers and the companies for which they work have invested a substantial amount of time and money into the creation of AI machines, for the most part, they would not be able to enjoy copyright protection or the financial benefits associated with it. This trend could ultimately limit innovation by dissuading developers and companies from investing in AI research, resulting not only in the decline of AI but also in the decline of innovation across a number of related sectors."

feelings.[875] If one, however, takes a more objective and public perspective on interests – as John Finnis does[876] – the question is whether an AI can flourish by including goods such as "life, knowledge, play, aesthetic experience, friendship, practical reasonableness, and religion."[877] Solum argues that despite AI's lack of a biological "life", it may still lay claim to a life that experience goods like knowledge, play, friendship, practical reasonableness, and perhaps even religious.[878] Finnis does not rule out such "life" from non-humans. But if we take Finnis's theory too literally (*i.e.*, good lives include athletic competition, good food, parenting, children, *etc.*) this raises a theoretical wall since AI, at least as we can perceive it today, might not have Finnis's "good life".[879] I concur with Solum that "AIs might claim that they do have interests and goods, but that the good for an AI is quite different than it is for humans."[880]

A good argument could be made for creating a new model for AI-IP under utilitarianism. We can challenge the "only humans deserve authorship" argument by countering that AI

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[875] As I have indicated in the previous chapter, it seems plausible that AI will be able to "lie" making humans believe that they have feeling.
[876] John Finnis explains "life" as follows: "The term 'life' here signifies every aspect of the vitality … which puts a human being in good shape for self-determination. Hence, life here includes bodily (including cerebral) health, and freedom from the pain that betokens organic malfunctioning or injury." Joh Finnis, *Natural Law & Natural Rights*, 2nd ed (Oxford: Oxford University Press, 2011) at 86. Obviously, there is an argument to be made here against the manipulation of Finnis's theory for AI. True, Finnis clearly centered his philosophical basis on human and humanity. However, what if the concept of "life" as Finnis defines it can be attenuated to non-human creation that can express "life"?
[877] Solum, *supra* note 236 at 1272. Finnis, *ibid* at 155, further develop his ideas: "For there is a 'common good' for human beings, inasmuch as life, knowledge, play, aesthetic experience, friendship, religion, and freedom in practical reasonableness are good for any and every person. And each of these human values is itself a 'common good' inasmuch as it can be participated in by an inexhaustible number of persons in an inexhaustible variety of ways or on an inexhaustible variety of occasions. These two senses of 'common good' are to be distinguished from a third, from which, however, they are not radically separate. This third sense of 'common good' is the one commonly intended throughout this book, and it is: a set of conditions which enables the members of a community to attain for themselves reasonable objectives, or to realize reasonably for themselves the value(s), for the sake of which they have reason to collaborate with each other (positively and/or negatively) in a community."
[878] AI and religion is explored in the reboot of *Battlestar Galactica 2004* TV series. See Wikipedia, "Battlestar Galactica (2004 TV series)" (last edited 30 September 2018), online: <en.wikipedia.org/wiki/Battlestar_Galactica_(2004_TV_series)>.
[879] I did mention several science fiction movies or TV series which show AIs experiences good food and relationships and thus might have Finnis's good life. However, those examples are fictional, and in the scientific community, there is no support for Finnis's vision.
[880] Solum, *supra* note 236 at 1272.

authorship and inventorship can serve society better. The lingering question concerns the right structure of this new AI-IP theory. And to face that question requires addressing incentive doctrine. Incentive doctrine is based on the notion that "individuals will not invest in inventions or creation unless the expected return from doing so exceeds the cost of doing so."[881] Granting exclusive rights to authors or inventors imposes social costs on the public that can only be justified "to the extent that they do on balance encourage enough creation and dissemination of new works to offset those costs."[882]

In the AI era, incentive theory might lose its substantive grip because computers cannot be incentivized since they are already programmed to create.[883] This claim might be false; if we expect AI to possess human qualities, we can expect that AI will share similarities to human behaviour, given that "both robots and AI agents create problems for law because one cannot always predict what they will do when they interact with their environment."[884] Further, as Yanisky-Ravid suggests, assuming that there would be no real need to incentivise AI to create – an assumption I am not willing to make yet – and that AI would be able to produce good works, the "existing balance would be thrown off", since "there wouldn't be any risk of a lack of artistic creation even

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[881] Mark Lemley, Peter Menell & Robert P Merges, *Intellectual Property in the New Technological Age*, 5th ed (Aspen Publishers, 2010) at 12. Abbott, *supra* note 656 at 1096, further explains the rooted basis for the incentive theory: "Congress is empowered to grant patents on the basis of the Patent and Copyright Clause of the Constitution … It also provides an explicit rationale for granting patent and copyright protection, namely to encourage innovation under an incentive theory. The theory goes that people will be more inclined to invent things (*i.e.*, promote the progress of science) if they can receive government-sanctioned monopolies (*i.e.*, patents) to exploit commercial embodiments of their inventions. Having the exclusive right to sell an invention can be tremendously lucrative." See also Garrett Hardin, "The Tragedy of the Common" (1968) 162: 3859 Science 1243.

[882] Lemley, Menell & Merges, *ibid* at 14. This perception is well established in the US law and economy approach, as I have discussed in earlier parts. We should, however, be reminded that copyright is not the only legal mechanism that govern dissemination of art. Contract law can allocate copyright to other entities, see e.g. Pamela Samuelson, "Mapping the Digital Public Domain: Threats and Opportunities" (2003) 66 Law & Contemp Probs 147; Yanisky-Ravid, Generating Rembrandt, *supra* note 236.

[883] This notion was shared by Yanisky-Ravid and Xiaoqiong (Jackie) Liu, stating in a recent paper that "autonomous machines do not need any incentive - that incentive is relevant only to people and entities until machines, robots and AI systems start producing […]." See Yanisky-Ravid & Liu, *supra* note 293 at 2239.

[884] Balkin, *supra* note 11 at 51.

if copyright law did not exist to protect such creations. Such a reality could, furthermore, pose an existential threat to the entire copyright regime."[885] It is more likely, however, that machine creations in the coming decade would not rise to human expectation and quality, making human creations even more valuable, an outcome which might result in creating two (or more) markets: high human art and low machine (IKEA) art. This future requires a stronger copyright regime. From an AI-IP rights perspective, even in this future, there is a real need to copyright AI creations from a policy standpoint. Given the importance of preserving human art – *i.e.*, incentivize human creators – denying AI works protection would result in free access to AI works, which would make competition conditions for human creations harder.

Moreover, incentive theory may be irrelevant in the future both for humans and non-humans. As Lemley stated rhetorically: "Why are people creating so much content without the incentive of IP rights? And why hasn't the sky fallen on the content industries?"[886] Additional studies have claimed that "[p]sychological and sociological concepts can do more to explain creative impulses than classical economics. As a result, a copyright law that treats creativity as a product of economic incentives can miss the mark and harm what it aims to promote."[887] Clearly, the Internet era brought new and different variables into play. Although they might not be relevant to AI as non-humans, the AI era may herald similarly divergent variables that would change, diminish, or extinguish the existing incentive theory.

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885 Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 703. Indeed, as Ginsburg & Budiardjo, *supra* note 714 at 2, recently argue, "The digital era exacerbates the anxiety of authorship, as 'artificial intelligence' supposedly supplants human artists, writers and composers in generating visual, literary and musical outputs indistinguishable from human-produced endeavours."
886 Lemley, IP in a World Without Scarcity, *supra* note 27 at 487.
887 Tushnet, Economies of Desire, *supra* note 414 at 515; Silbey, The Eureka Myth, *supra* note 414.

2.4.2 Does a Lockean Basis Exist for AI-IP Theory?

Several indications can be found in Locke's theory in support of allocating rights to AI. This discussion testifies to the Lockean theory's validity and strength, which is still a vital player in the development of IP laws, a position that should continue for the next decades.

At first blush, Lockean theory seems not to recognize AI rights. Lockean theory acknowledges a *person's* right in the fruit of his/her labour, as one of Locke's core arguments is that "a person who labors upon resources that are either unowned or 'held in common' has a natural property right to the fruits of his or her efforts."[888] AI and all its subsequent creations are the product of a person's labour in coding or manufacturing that AI, so Locke might consider all of those fruits as belonging to the programmer. In a world in which "there is enough and as good left in common for others",[889] there is no basis to restrict programmers from their just right in their AI fruits.[890]

Now, even under the assumption that Lockean theory generally accepts a programmer's right to his/her AI's independently created works, causation becomes more remote and the programmer's unjust enrichment increases as the connection between that programmer and the AI's output distances. Thus, even according to the Lockean theory, the programmer should be allowed limited or none of the fruits of the AI's labour.[891] Yanisky-Ravid echoes this conclusion in stating that "when a creator is a machine, robot, or AI system, the personality theory and the labor theory are irrelevant." In her view, "we do not need to recognize a programmer for an artistic

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[888] Fisher, *supra* note 407 at 170.
[889] Locke, *supra* note 258 at 134.
[890] Yanisky-Ravid & Liu, *supra* note 293 at 2242 adopt Locke's theory "only to the extent of arguing that inventors should be awarded for the fruits of their labor."
[891] Nozick, *supra* note 477 at 178-182.

accomplishment that is not his or her own."[892] In a more recent paper, Yanisky-Ravid and Liu clarify that "proper application of Locke's labor theory" depends on the definition of the "fruits" that could result from the contribution of each player in the creation process.[893] Accordingly, they explain, "Locke's labor theory calls for compensating those players, including the programmers, with a portion of the profits from the subsequent inventions created by the AI, in light of the programmers' and other players' contributions."[894] Yanisky-Ravid based these ideas on her multiplayer-model and the assumption that AI could not and should not be entitled to IP rights. I do not share those assumptions as I have explained in earlier parts and as I will further develop.

We might be able to derive further insights from Locke's manifesto, *On Parental Power*,[895] which seems to reflect Locke's opinion on the moral right of parents to their children's creations.[896] Locke emphasized the preservation of the natural right stating that parent's rights are limited by nature and that even if a father has a right to "enacting penalties on his children … *he has no dominion over the property or actions of his son*."[897] This puts it mildly since Lockean theory lacks any justification supporting a child's obligation to provide his/her parent with property or economic rights indefinitely.

Locke's philosophy is rooted in the concept that people are free and consent is required to

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[892] Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 707. Yanisky-Ravid offers an alternative model – AI work made for hire – which I shall address in Part III.
[893] Yanisky-Ravid & Liu, *supra* note 293 at 2242: "The division of profits among the various players – the AI programmers, trainers, owners and operators – should reflect their respective contributions to the development of the inventions created by the AI."
[894] *Ibid*.
[895] Locke, *supra* note 258 at chapter VI.
[896] I concede that it is not identical to the programmer-AI relationship, but it is similar enough to extract some analogous philosophical reasoning. Locke was not the only philosopher to discuss the relation between parents and children. See also John Stewart Mill, *On Liberty* (Ticknor and Fields, 1863).
[897] [Emphasis added]. Locke, *supra* note 258 at 157. And yet ironically Lockean theory is so often exploited to support lengthy postmortem copyright duration, even though children should have no justifiable reason to benefit from IP fruits of their parents' labour. See Jordan Fine, "Negotiating With Ghosts: The Arbitrariness of Copyright Terms" (2017) 29 IPJ 333.

exercise political authority on another individual.[898] Children, however, are not full citizens so they cannot consent to governmental political authority, as Nozick suggested.[899] Scholars have argued that Locke's theory supports a view that natural parents *own* their child since the child is the product of the parent's labour.[900] Hettinger remarks that "[i]f property rights in the very things created were always an appropriate reward for labor … parents would deserve property rights in their children."[901] Nozick argues that Locke failed to distinguish between children as the product of labour and any other product of labour. For Nozick, this lacuna in Locke's theory nullifies the very essence of Locke's theory:[902]

> *"If the point is that people cannot own their children because they themselves are owned and so incapable of ownership, this would apply to owning everything else they make as well. If the point is that God ... is the maker of a child, this applies to many other things that Locke thinks can be owned [...]."*

For Locke, however, children do not lack *all* rights perpetually; parents serve only as temporary guardians over their children's rights, so certain parental power over children is warranted, but temporary. Locke began his manifesto on paternal power by echoing his initial statement that "all

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[898] Locke, *supra* note 258 at 122: "A state also of equality, wherein all the power and jurisdiction is reciprocal, no one having more than another; there being nothing more evident than that creatures of the same species and rank, promiscuously born to all the same advantages of nature and the use of the same faculties, should also be equal one amongst another without subordination or subjection; unless the lord and master of them all should, by any manifest declaration of his will, set one above another, and confer on him by an evident and clear appointment an undoubted right to dominion and sovereignty."
[899] Nozick, *supra* note 477 at 287. Nozick rejects Locke's idea that a child's consent to parental power provides an intriguing allegory (that might have written today to describe the relation children have with social media): "Some members of the Board maintain that by accepting the benefits of growing up under the wing of the corporation and by remaining in its area of influence, the youngsters have already tacitly consented to be shareheld [...]." Putting it mildly, Nozick strongly opposes this suggestion by claiming that "tacit consent isn't worth the paper it's not written on […]."
[900] Locke, *supra* note 258 at 134: "[E]very man has a property in his own person … The labour of his body and the work of his hands, we may say, are properly his. Whatsoever then he removes out of the state that nature hath provided and left it in, h*e hath mixed his labour with, and joined to it something that is his own, and thereby makes it his property*." [Emphasis added]. Parental labour as reflected by the education and means that parents provide to a child, and not only by their biological connection (conceiving the child and giving birth).
[901] Hettinger, *supra* note 407 at 41.
[902] Nozick, *supra* note 477 at 288.

men by nature are equal."[903] As developed by other legal philosophers, equality is not absolute, and "[c]hildren … are not born in this state of equality" and "[t]heir parents have a sort of rule and jurisdiction over them when they come into the world, and for some time after, but it is but a temporary one … *age* and *reason*, as they grow up, loosen them, till at length they drop quite off and leave a man at his own free disposal."[904] Equality is indeed a natural law given to all men and women but, as Locke suggested, it depends on "age and reason". As I have contended, reason is a prerequisite for any AI – let alone IP – right.[905]

Locke also explains that the law "in its true notion, is not so much the limitation as the direction of a free and *intelligent agent* to his proper interest, and prescribes no farther than is for the general good of those under that law."[906] The law, according to Locke, is an instrument for happiness and freedom for the intelligent agent:[907]

> *"Could they be happier without it, the law, as a useless thing, would of itself vanish; and that ill deserves the name of confinement which hedges us in only from bogs and precipices. So that, however it may be mistaken, the end of law is not to abolish or restrain, but to preserve and enlarge freedom; for in all the states of created beings capable of laws, where there is no law, there is no freedom."*

Locke's choice to use broad terms like "intelligent agents" and "created beings" when emphasizing the law's crucial role in fostering freedom, suggests that such freedom is not reserved merely for humans. After all, AI could easily fit plain language definitions of "created being" and "intelligent

[903] Locke, *supra* note 258 at 147.
[904] [Emphasis added]. *Ibid*.
[905] It should be noted, however, that in the past decades, children's rights were recognized (and extended) in the US and other jurisdictions. See e.g. Ursula Kilkelly & Laura Lundy, eds*, Children's Rights* (New York: Routledge, 2017); Mary Ann Mason, *From Father's Property to Children's Rights: The History of Child Custody in the United States* (Columbia University Press, 1996).
[906] [Emphasis added]. Locke, *supra* note 258 at 148.
[907] [Emphasis added]. *Ibid*.

agent", so according to Locke, AIs deserve to express freedom.

In drawing similarities between justifications underlying parent-child and programmer-AI relationships, we should also accept Locke's position limiting a creator's (parent's or programmer's) rights on two conditions: (1) time – the rights are not indefinite; and (2) reason and intelligence as a prerequisite to establish independence. First, parental power over their children is limited until the moment in which "reason shall take its place and ease them [the parents] of that trouble [of taking care of their children]."[908] Also, Locke differentiates between the parent and the child in stating that "he that understands for him must will for him too; he must prescribe to his will and regulate his actions; but when he comes to the estate that made his father a freeman, the son is a freeman too."[909] Second, reason and intelligence serve as an important criterion for legal rights in Locke's view:[910]

> *"The freedom then of man, and liberty of acting according to his own will, is grounded on his having reason which is able to instruct him in that law he is to govern himself by, and make him know how far he is left to the freedom of his own will."*

In conclusion, Lockean theory provides several justifications for AI-IP. Locke's views on parent-child relationship, equality, freedom, and liberty rights to intelligent agents all serve as justification for AI-IP theory.

2.4.3 The Personhood Dilemma

Hegel's philosophy could advocate for AI's legal standing as part of accepting its personhood and autonomy rights. Hegel argues that a bond exists between a man and his property. Depriving the

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[908] *Ibid* at 149.
[909] *Ibid*.
[910] *Ibid* at 151.

person of his property causes discomfort and pain. Accordingly, by proving AI's attachment to its creations, we might assume that AI possesses a semi-human personality. This personhood status can be integrated into the *Turing Copyright Test*.[911]

Kantian and Hegelian approaches, however, are based on a creator's emotional connection to the creative work. At AI's current stage, it seems implausible to assume it holds any emotional connection to its created work.[912] As Abbott observes, "Creative computers invent because they are instructed to invent, and a machine would not be offended by the manner in which its inventions were used."[913] Nevertheless, we might assume that future AIs could sustain a level of intelligence allowing them to develop a more substantial connection to their creative output. If that is the case, the question is whether to develop an AI-IP based model that relies on that personal connection? And if so, should we not also consider a programmer's personal connection to his AI creation's creation? The personhood theory might support a programmer's rights to his AI's creations even when the AI itself can also develop a real connection to its creation.

Several conclusions can be drawn from Fisher and Radin's arguments as outlined earlier in this part.[914] First, AI-IP theory should adopt Fisher's suggestion to differentiate between different expression levels in IP, from highly expressive and innovative creations to low expressive creations. Post-differentiation, AI-IP theory should allocate various levels of protection across this spectrum of expressiveness. Parchomovsky and Stein support this approach in their paper, which

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[911] Turing invented the "imitation game", the name he gave to his AI test. See Turing, *supra* note 44. Turing argued for the possibility of computer programs ascending the human intelligence. Turing aspired to "test whether the artifact was indistinguishable from a person with regard to what he took to be pertinent property, *verbal behavior*." [Emphasis in original]. The Turing Test seeks to evaluate whether a machine is able to exhibit intelligent behaviour. The Copyright Turing Test will assess AI creativity. If the AI passes the test, we might as well claim that the AI deserves to be recognized as the author.

[912] Yanisky-Ravid & Liu, *supra* note 293 at 2242 at 2243: "Consequently, an AI system cannot be entitled to patent rights to its creations and inventions because personality is exclusively attributed to human beings."

[913] Abbott, *supra* note 656 at 1107.

[914] See part II.B(3).

also considers allocation across originality spectrum.[915]

In essence, there is no reason to monopolize creations or innovation that lack real value. Though defining levels of creative and innovative expression may be difficult and highly subjective in practice, it can be emphasized theoretically that some works and inventions are more original and innovative than others. This approach would subsequently increase the public domain and reward only works able to prove a level of investment truly deserving IP protection.

A range-based IP protection regime would need to be adapted to accommodate computer-generated and AI works. For example, as computer programs advance along with their ability to create genuine and innovative creations, so the validity of the justification to award creativity and originality with a higher level of protection is correspondingly strengthened. Beyond Parchomovsky and Stein proposal, I suggest that when computer-programs and AIs produce highly creative works or innovative inventions unexpected by the original programmer's intent, such unexpectedness (or non-obviousness in patents) can indicate independent creation by the computer program or AI. Simply put: When an AI creates an independent work or invention, IP should not be awarded to the programmer or the owner of the program.[916]

Several of Radin's four conceptions of a person might also be well suited for AI. For example, one element in Radin's conception of a person is his ability to think – his intelligence, having self-awareness, and memory. Under this conception, for an AI to deserve all rights, it must demonstrate the ability to think, remember, to be self-aware, and this may never occur or be

[915] Parchomovsky & Stein, *supra* note 427 at 1507-8 introduce three mechanisms to change the level of protection in copyright. First, the doctrine of equivalents, which "designed to afford the maximum degree of protection to exceptionally original works"; Second, the added value doctrine "will govern infringement actions involving works of standard or average originality … compare the relative originality of the plaintiff's work with that of the defendant"; Third, the sameness rule "will regulate copyright conflicts that involve minimally original or nonoriginal works. The rule will create a rebuttable presumption of copying when an allegedly infringing work containing minimal originality is substantively similar to the plaintiff's work."
[916] I address the questions of AI authorship and ownership in Part III.

provable. Even then, it may be permissible to grant AI certain rights, without recognizing the full capacity of a human's rights – or better yet, reserving those rights until such intelligence is proven. It is important to note that a "person" need not necessarily mean a "human being"; "[i]n Roman law, persona came to mean simply an entity possessing legal rights and duties … for philosophers the nature of a person has never been reduced to a generally accepted theory."[917]

2.4.4 Social Planning Theory

Social planning theory is centred around the idea that IP rights should promote social good. As I have expressed earlier, IP rights do not currently optimally maximize social good. And, as Abbott suggests, allocating IP rights to AI may help since AI could develop new technologies that will eventually benefit humanity. The mere possibility that computer-generated works can be produced without human interference means that scientists and researchers could devote their work toward developing the most efficient socially-beneficial programs without concern about patenting that output.

I argue that no reason exists in our current stage of computer programming and AI to limit patents, for example, only for inventions directly influenced by humans. This approach serves social planning theory to the letter. True, "AI could develop immoral new technologies",[918] but so could humans. Further, I do not endorse granting patents automatically without any human supervision or regulation. These risks could be avoided by other means.

Social planning supports AI rights even in future stages of development (*i.e.*, when AI becomes capable of expressing semi-human behaviour) if these rights benefit humanity. First,

[917] Radin, *supra* note 492 at 39. John Rawls developed the concept of a person in a way which might include an AI. Rawls distinguished between three conceptions of a person in his paper on Kantian Constructivism in Moral Theory. See John Rawls, "Kantian Constructivism in Moral Theory" (1980) 77 J Phil 515 at 533-535.
[918] Abbott, *supra* note 656 at 1107.

social planning theory opposes lengthy IP rights. Allocating AI rights to the public domain, while reserving its economic rights for the prosperity of the public and allocating its moral rights to the AI itself, will maximize creations or inventions available for public enjoyment.

This allocation model is not immune from criticism. First, we might promote two distinct levels of IP rights: for humans – which will remain practically the same; and for non-humans – which will be designed to benefit humans (allocating rights to AI means, in practice, providing the public with more access to creations). AI creations might prove more attractive for humans; thus human creations (authors and inventors) will trend toward obsolescence, a remnant of the past.

From a social perspective, it is hard to foresee whether this might be good or bad. Perhaps it is part of the natural evolution, much like changes in music preferences throughout history. On the other hand, perhaps as a consequence, human creations would become more valuable compared to "artificial" but easily accessible AI creations.

Second, AI rights promote democratic values and culture. Netanel's approach rejects recent endorsements of extensive IP protection (*e.g.*, for 3D printing) and supports instead promoting AI applications for personal users. There is no justifiable reason to limit or restrict technology that can benefit humanity, and that includes AI. As Fisher, Zemer, and Netanel might concede, limiting protection over AI creations forces inventors and creators to follow certain rules to patent, which in turn hinders AI development and potential. Increasing the size of the public domain available for inventions or works to be integrated into AI capabilities is preferable.

Several concerns exist regarding data availability or privatization in the future. It is vital to consider the theoretical implications on data as the building block of machine learning and AI programs.[919] Social planning theory likely opposes any privatization of data. Any limitation on data usage (in which IP has a crucial role) also limits research in machine learning (and subsequently AI). Under a socialist theory, [920] the public – via the state – owned the capital. Since data could also be considered as a form of capital, socialist thinking would promote public ownership of data.

The question remains whether it is optimal for the government to control our data? The notion raises concerns, especially regarding privacy risks and censorship. The alternative, however, in which most of our data is held restriction- and supervision-free by corporations is equally problematic. A third scenario is probably best, in which the government establishes agencies and regulators to provide a "data safe environment".

2.4.5 Moral rights: An Alternative Approach for AI Rights?

Moral rights doctrine may offer an alternative route to developing AI-IP justifications. If we accept the assumption that AI can be regarded as a person under certain conditions, we should consider granting AIs a minimal standard of moral rights over its creations (like the rights of attribution or withdrawal).[921] This would act as a compromise: we allocate moral rights for non-human AI creators – recognizing the bond between the AI and its creations – while also reserving economic rights allocation for human creators. Despite numerous popular objections (even for human creators),[922] moral rights present an appealing IP pathway to protect AI creations.

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[919] Big Data poses significant concerns. See Canada Competition Bureau, *supra* note 204.
[920] Karl Marx, *Capital: A Critical Analysis of Capitalist Production*, Friedrich Engels, ed (New York: Appleton & Company, 1889) 365 (Marx addressed the impact the technology might have on humanity in the IV part of his manifest on Capital). See also Nick Dyer-Witheford, *Cyber-Marx: Cycles and Circuits of Struggle in High-technology Capitalism* (University of Illinois Press, 1999).
[921] In an era where we can expect many works to become intangible, enforcement would become a challenge. However, as Sundara Rajan explains, "the fact that rights are difficult to enforce does not necessarily mean that they should be dispensed with." Sundara Rajan, *supra* note 552 at 6.
[922] As Sundara Rajan, *supra* note 552 at 16, explains: "The power of moral rights can create a sense of uneasiness. It leads to the question of whether mechanisms exist to limit the possibility of negative effects on industry or, indeed,

While, commercially speaking, AI lacks the need or desire for financial gain, we may all benefit from granting AI moral rights recognition. First, by adhering to common and internationally accepted copyright practices there would be no need to allocate any effective legal rights to AI. Second, moral rights can be applied in a way that distinguishes between AI, human (and any AI-human hybrid) creations. Thus, promoting quality assurance by preventing exploitation, alteration, or manipulation of AI works.

I acknowledge one challenge, as the distinction between allocating integrity rights to AI – as reasoned immediately – and attribution rights is perhaps harder to justify. Indeed, at the current stage of its development, AI does not possess elements such as honour or reputation to prejudice. However, in the future AI might be able to express these elements.

We can grant AI a limited scope of rights (like the rights of attribution and integrity) which serves the purpose – as Sundara Rajan suggests – of distinguishing between AI and human creations. By doing so, the public can gain full access to AI creations (protected under moral, not economic rights) while their economic rights are managed by a governmental or an international organization which can reinvest AI's earnings into education, health, and other causes for human benefit (similar to Norway's oil profits model).[923]

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culture." Furthermore, from an economic perspective, moral rights "may inhibit the exploitation of creative works … by bringing uncertainty to the process of using, editing, modifying, or interpreting works, discouraging the growth of both industry and art around the existing wealth of human culture." *Ibid* at 18. From a public policy perspective, moral rights may inhibit "the publication of creative works, while moral rights claims could penalize those who undertake to disseminate them." *Ibid*. This argument reflects the general claim that copyright, as a whole, is a state monopoly that restricts creations from the public domain. In that respect, establishing moral rights is an extension of this monopoly and an additional restriction on the public.

[923] The Government Pension Fund of Norway (known as the Oil fund) was established in the 1990s to invest the surplus of Norwegian petroleum assets. See Norway, "The Government Pension Fund", online: <regjeringen.no/en/topics/the-economy/the-government-pension-fund/id1441>.

This is all to say that once we recognize AI-IP rights, then we can regulate those rights through IP law in order to create the right incentives and restrictions to regulate and maximize the public pool of knowledge for the benefit of human society.

PART III: AI AUTHORSHIP

'We are the products of editing, rather than of authorship.' (George Wald)

3.1 BUILDING A NEW AI AUTHORSHIP

For the Bristlecone Snag:
'A home transformed by the lightning
the balanced alcoves smother
this insatiable earth of a planet, Earth.
They attacked it with mechanical horns
because they love you, love, in fire and wind.
You say, what is the time waiting for in its spring?
I tell you it is waiting for your branch that flows,
because you are a sweet-smelling diamond architecture.'
that does not know why it grows.'

You might be fooled into believing this poem was a human creation. You would not be alone; the editorial of one of the oldest student literary journals was deceived by Zackary Scholl's poetry generator.[924] As my previous parts made clear, core questions arise from computer-generated works: Who is its author? Is it copyrightable? If so, who is the owner? Should we devalue art just because it is the creation of a machine? What happens in cases like Scholl's where no human is identified as author, and/or the creation is not known to be computer-created? On this last question, this example reveals an important truth. People are easily deceived, and even professionals are susceptible to confusing human art and artificial/computer-generated art.

To answer these questions, we must revert to the basic concept of authorship. Suffice to say for that example, the author is the programmer, Scholl. He modified a computer program to use a context-free grammar system to generate poems. For Scholl's program, it is easy to

[924] Brian Merchant, "The Poem That Passed the Turing Test: They Should Have Sent a Computer" (5 February 2015), online: *Motherboard* <motherboard.vice.com/en_us/article/vvbxxd/the-poem-that-passed-the-turing-test>.

demonstrate and prove his influence on the creative process that eventually produced this poem. Scholl is indeed the owner of the program and its output.[925]

Innovations in machine-learning and artificial intelligence technology pose many different challenges to copyright law.[926] Guadamuz described Google's Deep Dream as an application that "mimics human thinking and makes a decision as to how to transform the input based on a pre-determined algorithm."[927] The novelty of Deep Dream, and its ilk, is that the program itself – not the programmer – eventually makes its own artistic decisions about what it should amplify in the image. This creates an unpredictable result. The result of the process provides different levels of abstraction, producing "new images that do not resemble the originals, but most importantly, they are not the result of creative decisions by the programmers, but rather they are produced by the program itself."[928]

I propose beginning my revisit to copyright's core by exploring the seminal question of *who*, or as Michael Foucault asked, *what* is an author. I begin here, as Andrew Bennett noted, because "[t]he history of literary criticism from the earliest times may in fact be said to be

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925 See e.g. *Apple*, *supra* note 631 at 1249.

926 Based on biological neural networks, see Marilyn M Nelson & W T Illingworth, *A Practical Guide to Neural Nets* (Addison-Wesley, 1991).

927 Guadamuz, *supra* note 422 at 171. Deep Dream is a computer vision program that uses convolutional neural networks to enhance image patterns. You can experience Deep Dream capabilities at the Deep Dream Generator, online: <deepdreamgenerator.com>.

928 *Ibid* at 173. This conclusion, however, is debatable. Reading the researchers (the programmers) description raise few questions as to the independence and free will of the program. The researchers describe their input as follows: "Instead of exactly prescribing which feature we want the network to amplify, we can also let the network make that decision. In this case we simply feed the network an arbitrary image or photo and let the network analyze the picture. We then pick a layer and ask the network to enhance whatever it detected. Each layer of the network deals with features at a different level of abstraction, so the complexity of features we generate depends on which layer we choose to enhance." Alexander Mordvintsev, "Inceptionism: Going Deeper into Neural Networks" (17 June 2015), online (blog): *Google Blog* <research.googleblog.com/2015/06/inceptionism-going-deeper-into-neural.html>. It seems that by picking the layer and feeding the program specific images part of the artistic decision is at the programmer's choice.

organized around conceptions of authorship …" Literary theory, we might say, "is largely a question of author theory."[929]

The definition of authorship has been contested for centuries and developed differently across jurisdictions. Despite these differences, most jurisdictions exclude animals and computers from authorship.[930] Historically and globally, creativity's source was assumed to be solely human.[931] As a result, and as I explain further below, the world has collectively deemed non-human creations as inferior and unworthy of legal protection.

More recently, the concept of authorship has faced waves of criticism and change. Christopher May and Susan Sell remind us that authorship (as with other intellectual property fields) is also the ongoing struggle to seek control of and exploit valuable knowledge and ideas.[932] Oren Bracha adds that copyright was shaped by interactions between elements still present in AI debates such as "technology, economic elements, ideology, existing institutional practices, and other social factors."[933] As I argued in previous parts, and further contend below, it is vital to understand that humans design all laws – copyright included – so our interactions, expectations, and conceptions affect and justify those laws. As with money, human recognition gives laws value.

There are many options for authorship with AI: the programmer, the user, or the AI itself, joint authorship between all three, or perhaps none at all if the work falls into the public domain or if AI is disqualified as a rights-bearer. By exploring who an author can or should be for AI works, I explore if changes are needed in the normative basis of our legal system – *i.e.*, recognizing

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[929] Andrew Bennett, *The Author* (London: Routledge, 2004) at 4.
[930] Vaver, *supra* note 237 at 115.
[931] Clifford, *supra* note 803 at 1676.
[932] Chirstopher May & Susan K Sell, *Intellectual Property Rights: A Critical History* (Boulder, Colo: Lynne Rienner Publishers, 2006) at 4: "Long before there was a formal legal definition of intellectual property, there were many attempts to control valuable knowledge and information by groups who stood to gain from it exploitation."
[933] Oren Bracha, *Owning Ideas: The Intellectual Origins of American Intellectual Property, 1790–1909* (New York: Cambridge University Press, 2016) at 32.

AI as a legal rights-bearer – or if changes in copyright laws are required in order to acknowledge new sources of creation. If significant changes are needed for either, I do not concede that they must be instantaneous. In our current stage of computer-assisted and computer-generated works, our current legal framework might be sufficient.[934] All we might need are a few tweaks and amendments to that framework to regard any work, whether human-created or not, as copyrightable. It may also do with changes aimed at preventing abuse of computer-generated works, as I will explain further.

In Part I, I had outlined the AI debate. In Part II, I had explored ways that IP theories might include AI creations and inventions as part of a new IP law regime. Part III builds on the two previous parts, as well as follows arguments and ideas that surfaced earlier. First, I will explore and challenge our current conceptions of the "author". I will reflect on some of copyright's legal exceptions and justifications. This discussion correlates with the IP theory discussion I had purposely "neglected" in Part II, delving deeper into authorship. Second, I will seek an answer to the question posed above: Who (or what) is the author? Third, I will provide a comparative outline of two copyright standards – originality and creativity – as developed in several jurisdictions.

The following sections also aspire to draw preliminary conclusions for a broader concept of originality that might benefit human and non-humans alike.

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[934] James Grimmelman argues that there are no AI authors: "It is possible that some future computer programs could qualify as authors. We could well have artificial intelligences that are responsive to incentives, unpredictable enough that we can't simply tell them what to do, and that have attributes of personality that make us willing to regard them as copyright owners. But if that day ever comes, it will because we have already made a decision in other areas of life and law to treat them as persons, and copyright law will fall in line. But unless those mechanical minds also invent workable time travel, their future existence is of no bearing now. The copyright issues we would face on that far off day are fundamentally different in kind from those we face today." James Grimmelman, "There is No Such Thing as a Computer-Authored Work- And It's a Good Thing, Too" (2016) 39 Colum J L & Arts 403 at 414.

3.2 UNDERSTANDING (HUMAN) AUTHORSHIP

3.2.1 Who is an Author?[935]

Even though copyright law is relatively new and was not part of the classical world, as a legal regime copyright was always susceptive to technological advancements.[936] However, it was not until the invention of the printing press – allowing the production of affordable copies of books – that copyright's modern legal conception was born.[937]

Copyright, "began with 'authorship'," while copyright law served as the mechanism to "solidify the notion of literary property."[938] Authorship is one of "the more elusive concepts in copyright law,"[939] and, as Peter Jaszi offers, the "centrality of [the] concept is an uncritically accepted notion."[940] SCOTUS described it as the "very 'premise of copyright law'."[941]

Author rights refer to original works "created by 'authors', such as books, plays, music, art, and films" that possess some degree of creativity.[942] Vaver adds that "[t]he term compendiously describes whoever writes a book, letter, or play, as well as every other producer of creative works [...]."[943]

Our views on authorship within copyright law evolved with rhetoric, as Mark Lemley

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[935] Alternatively, should I rather ask – "What" is the author as Michel Foucault challenged in his monumental book. See Michel Foucault, "What is an Author" in *The Foucault Reader*, Paul Rabinow, ed (New York: Pantheon Books, 1984) at 101.
[936] *Copinger & Skone James On Copyright*, 14th ed by Kevin Garnett, Gillian Davies & Gwilym Harbottle, eds (London, UK: Sweet & Maxwell, 1999) at 31-32: "Although there is plenty of evidence that Greek and Roman authors were greatly concerned to be identified as the author of their work and that their authorship should be recognised."
[937] *Ibid* at 31.
[938] Peter Jaszi, "Toward a Theory of Copyright: The Metamorphoses of 'Authorship'" (1991) 1991 Duke LJ 455 at 466.
[939] Alan R Durham, "The Random Muse: Authorship and Indeterminacy" (2002) 44 Wm & Mary L Rev 569 at 571.
[940] Jaszi, *supra* note 938 at 471.
[941] Durham, *supra* note 939.
[942] Bently & Sherman, *supra* note 406 at 32. Neighbouring rights, in contrast, "refer to 'works' created by 'entrepreneurs', such as sound recording, broadcasts, cable programmes, and the typographical format of published editions."
[943] Vaver, *supra* note 237 at 115.

suggests "[t]he rise of property rhetoric in intellectual property cases is closely identified not with common-law property rules in general, but with a particular economic view of property rights." This view emphasizes the importance of private ownership as a solution to the economic problem known as the tragedy of the commons.[944] The basic propertization idea strengthens the individual's perspective of authorship while simultaneously weakening the public domain.[945] Indeed, "[t]he 'authorship' concept, with its roots in notions of individual self-proprietorship, provided the rationale for thinking of literary productions as personal property with various associated attributes including alienability."[946]

The modern author concept developed during the eighteenth century[947] as a shift from a poetics of imitation to "a valorization of originality", with the "writer" becoming an "author".[948] Copyright did not reach its modern form as a "discrete area of law that grants rights in works of literature and art" until the mid-nineteenth century.[949] In the UK, only after the passage of the

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944 See Mark Lemley, "Romantic Authorship and the Rhetoric of Property" (1997) 75:4 Tex L Rev 873 at 897 [Lemley, Romantic Authorship]. See also D'Agostino, *supra* note 408 at 51: "The author was a proprietor inherently deserving if the fruits of the fruits of his labor. The author as owner of ideas was likened to an owner of property threatened by trespassers on his land. The literary work began to be seen as a 'form of estate'."

945 Lemley, Romantic Authorship, *ibid* at 902: "What is going on here is not the product of some eighteenth-century vision of authorship with unfortunate consequences. Rather, it is a wholesale attack on the public domain in intellectual property law. The attack does not simply consist of multiple efforts to whittle away the scope of that domain for the benefit of those who get to own pieces of it, though that is certainly part of it. Rather, the attack is more fundamentally a challenge to the very idea of the public domain as an intrinsic part of intellectual property law. Now, I happen to think that the 'propertization' of intellectual property is a very bad idea."

946 Jaszi, *supra* note 938 at 472. Zemer argues that traditional proprietarianism emphasizes "that every theory relates in one way or another to the bundle of rights associated with the right to traditional tangible property – the right to use, the right to exclude others from use and possession, and the right to transfer the owned object as a gift, by sale or bequest – and with traditional principles of trespass and encroachment into one's private dominion." See Zemer, On the Value of Copyright Theory, *supra* note 418 at 67.

947 During the sixteenth and seventeenth centuries, copyright law "served to control the printing and distribution of books rather than to protect author's rights. Until the eighteenth century, in England, this form of protection took to form of privilege or a monopoly granted by the Crown to certain printers." See D'Agostino, *supra* note 408 at 42. See also Jaszi, *supra* note 938 at 468-471; Jane Ginsburg, "The Role of Authorship in Copyright" in Ruth L Okediji, ed, *Copyright Law in an Age of Limitations and Exceptions* (New York: Cambridge University Press, 2017) at 60.

948 Craig, *supra* note 489 at 13-14.

949 Bently & Sherman, *supra* note 406 at 33.

Copyright Act in 1911 was copyright law "rationalized and codified into the type of modern, abstract, and forward-looking statute."[950]

In America, James Madison and Charles Pinckney reflected on the "congressional powers relating to the encouragement of learning technological innovation."[951] These discussions eventually lead to what is known today as the *US Copyright Clause*, which empowered the US Congress "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."[952] However, as Oren Bracha notes, "In 1800 American copyright law was still the unique regulation of the book trade, which retained the traditional institutional features of the publisher's economic privilege, now bestowed on authors under a universal regime of rights."[953]

The *Statute of Anne* in 1710[954] is considered, by most copyright historians, as the catalyst to developing the modern author.[955] In Jaszi's words, it was "a conceptual move that gave us copyright as we know it."[956] D'Agostino explained that the Statute "officially ended the system of privileges, granted the author copyright protection, aimed to encourage the composition of socially

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950 *Ibid*. The *Statute of Anne* remined in force until repealed by the *Copyright Act* of 1842. The *1911 Copyright Act* "brought several major reforms in order to comply with the Belin Act of the Berne Convention on all points where it conflicted with the previous law of the United Kingdoms." Copinger, *supra* note 936 at 44. For example, the Act extended the term protection to life of the author plus 50 years (to match the international standard), and for the first time "provided that copyright should subsist in records, perforated rolls, and other contrivances by means of which sounds may be mechanically reproduced […]."

951 Bracha, *supra* note 933 at 48.

952 US Const art I, s 8 cl 8. Bracha, *supra* note 933 at 49, further opines that "[t]he important innovation of the constitutional clause was the creation of a national power to legislate in the fields of patent and copyright."

953 Bracha, *ibid* at 256.

954 Also known as the *Act for Encouragement of Learning*, 8 Anne, c. 19.

955 Copinger, *supra* note 936 at 37: "The Statute of Anne was the first copyright law, as such, in the world and it is the foundation on which modern concept of copyright was built." Copinger argues that there were two revolutionary principles established by the Statute: "[R]ecognition of the author as the fountainhead of protection and adoption of the principle of a limited term of protection for published works."

956 Peter Jaszi, "Is There Such a Thing as Postmodern Copyright?" (2009) 12 Tul J Tech & Intell Prop 105 at 107.

desirable works and prevent the practice of piracy."[957] It promoted John Locke's ideas of just labour and natural rights, which reflected two of the four central ideas of modern copyright law.[958] It marked a cultural change, divorcing copyright from censorship by structuring copyright as a property right rather than a regulatory mean.[959]

D'Agostino further explains that the book industry's growth from the 1730s onwards fuelled the English booksellers' copyright feuds.[960] On one side, authors argued to expand copyright and their ownership rights. Their concerns dealt "mainly with royalties and moral rights, objecting to publication without consent, false attribution of authorship, and modifications to the text that were harmful to their reputation."[961] On the other side – as Mark Rose observed – others argued that no one could and should have ownership of ideas and that copyright must be limited and restricted.[962] These struggles framed modern copyright law, and the core values and ideas that led the debate still affect copyright scholarship to this day.

In many ways, the AI discussion parallels these early struggles. AIs are the new authors struggling for recognition and rights over the "old" institutions. The book publishers remain with

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957 D'Agostino, *supra* note 408 at 47. As D'Agostino further provides (quoting Ronan Deazley): "[F]or the first time since the incorporation of the Stationers' Company in 1557, not just the booksellers, but also the author, and indeed anyone else who was sufficiently inclined, was entitled to own and deal in the copies of works."

958 May & Sell, *supra* note 932 at 93. The other two, as May and Sell provide, are the stimulation of creativity and social requirements. For further discussion about the Lockean theory impact on IP and Copyright see e.g. Carys, Locke, Labour and Limiting the Author's Right, *supra* note 471; Zemer, The Making of a New Copyright Lockean, *supra* note 487; Merges, *supra* note 415, Part I, chapter 2 – Locke.

959 Mark Rose, *Authors and Owners: The Invention of Copyright* (Cambridge, Mass: Harvard University Press, 1993) at 48.

960 D'Agostino, *supra* note 408 at 52.

961 *Ibid* at 53.

962 Rose, *supra* note 959 at 91: "[T]he proponents of perpetual copyright asserted the author's natural right to own his creation. Second, their opponents replied that ideas could not be treated as property and that copyright could only be regarded as a limited privilege of the same sort as patent. Third, the proponents responded that the property claimed was neither the physical book nor the ideas communicated by it but something else, an entity consisting of style and sentiment combined."

us today, shaping this new fight over copyright expansion. The arguments evolved with technology, but the core values remain. It is still a debate over ideas, ownership, and royalties.

Slowly but steadily, authorship became an individual ownership right, as the romantic period took hold: "the author became the actual 'genius' innately inspired and thus capable of producing original work."[963] The Romantic period, which Ronald Barthes and Foucault identify at the late eighteenth and early nineteenth centuries,[964] emphasized the individual author and the sanctity of creativity.[965]

Barthes has described the author as "an individual creative personality, a solitary originator of stylistically consisted work."[966] Martha Woodmansee, Jaszi and Rose have pointed to the significant effect of the romantic author on the core values of copyright law, obscuring practical approaches to copyright and contributing to the preservation of economic rights for companies and publishers.[967]

Indeed, the romantic ideal of authorship, in which "the writer becomes an author",[968] has

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963 D'Agostino, *supra* note 408 at 49-50.
964 Bennett, *supra* note 929 at 55.
965 *Ibid* at 58, further explains: "The eighteenth-century philosophical, commercial and political emphasis on individuality, with its ideology of possessive individualism and its special privileging of authorial autonomy, is bound up with a transformation in the value of the idea of originality," and "[b]y the mid-eighteenth century, the notion of originality has become central to a conception of a newly empowered author."
966 Bridy, *supra* note 423 at 7. See e.g. Barthes, *supra* note 531 at 142-43.
967 Bridy, *ibid*. This era stands in contrast to the Renaissance and Neoclassical periods, as Woodmansee explains: "Whether as a craftsman or as inspired, the writer of the Renaissance and neoclassical period is always a vehicle or instrument: regarded as a craftsman, he is a skilled manipulator of predefined strategies for achieving goals dictated by his audience […]." Martha Woodmansee, "The Genius and the Copyright: Economic and Legal Conditions of the Emergence of the 'Author'" (1984) 17 Eighteenth-Century Stud 425 at 427 [Woodmansee, The Genius and the Copyright]. See also Martha Woodmansee & Peter Jaszi, eds, *The Construction of Authorship: Textual Appropriation in Law and Literature* (Durham: Duke University Press, 1994); Keith Aoki, "Authors, Inventors and Trademark Owners: Private Intellectual Property and the Public Domain Part I" (1993) 18 Colum.-VLA J L & Arts 11. A recent research discusses the importance of Woodmansee and Rose's work to the history of Copyright, see Kathy Bowrey, "Law, Aesthetics and Copyright Historiography: A Critical Reading of the Genealogies of Martha Woodmansee and Mark Rose" in Isabella Alexander & H Tomás Gómez-Arostegui, eds, *Research Handbook on the History of Copyright Law* (Edward Elgar Publishing, 2016) at 27 [*Research Handbook on the History of Copyright Law*]; Martha Woodmansee, "The Romantic Author" in *Research Handbook on the History of Copyright Law*, *ibid* at 53.
968 Woodmansee, The Genius and the Copyright, *ibid* at 429.

had an enormous influence on the development of copyright.[969] Zemer echoes Rose and Woodmansee by stating that the Romantic author "plays a significant role in copyright discourse, even if we do not expressly mention it."[970]

Several scholars have challenged the romantic author paradigm.[971] The perception of the author as a solitary creator, who with his unique abilities is creating original marvels, seems unrealistic and misguided.[972] As Barthes remarked: [973]

> *"The text is a tissue of quotation drawn from the innumerable centers of culture … the writer can only imitate a gesture that is always anterior, never original. His only Power is to mix writings, to counter the ones with the others, in such a way as never to rest on any one of them."*

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[969] Jaszi, *supra* note 938. See also Lemley, Romantic Authorship, *supra* note 944; Jane C Ginsburg, "Exceptional Authorship: The Role of Copyright Exceptions in Promoting Creativity" in Susy Frankel & Daniel Gervais, eds, *The Evolution and Equilibrium of Copyright in the Digital Age* (Cambridge University Press, 2014) at 15 and 23 [Ginsburg, Exceptional Authorship] (Ginsburg argues that the idealization of the romantic author led to an allocation of excessive legal protection). See also Cary J Craig, "Feminist Aesthetics and Copyright Law: Genius, Value, and Gendered Visions of the Creative Self" in Irene Calboli & Srividhya Ragavan, eds, *Diversity in Intellectual Property: Identities, Interests, and Intersections* (New York: Cambridge University Press, 2015) at 273 [Intellectual Property: Identities, Interests, and Intersections]; Rebecca Tushnet, "The Romantic Author and the Romance Writer: Resisting Gendered Concepts of Creativity", Intellectual Property: Identities, Interests, and Intersections, *ibid* at 294 [Tushnet, The Romantic Author and the Romance Writer].

[970] Zemer, *The Idea of Authorship*, *supra* note 526 at 74. Zemer rejects the romantic author views on the creation process. See also Lior Zemer, "The Copyright Moment" (2006) 42 San Diego L Rev 247 [Zemer, The Copyright Moment].

[971] Alexandra George, *Constructing Intellectual Property* (New York: Cambridge University Press, 2012); Zemer, *The Idea of Authorship*, *supra* note 526; Zemer, The Copyright Moment, *supra* note 970; Barthes, *supra* note 531; Tushnet, The Romantic Author and the Romance Writer, *supra* note 969 at 294 and 296.

[972] Craig, *supra* note 489 at 12-13. Craig applies Foucault's theory along with other prominent scholars such as Woodmansee and Rose challenging the modern author as a sole creator arguing that "such scholarship has brought attention to 'just how culturally specific and historically contingent such seemingly transparent terms actually are, and how complex the contexts in which they emerged, were contested, and gained legitimacy'."

[973] Barthes, *supra* note 531 at 146.

The concept of individualism is based on the romantic author's perception of the author as an individual genius.[974] The roots of individualism originate in the *Statute of Anne*,[975] which changed the legal standing of authors, granting them copyright protection "aimed to encourage the composition of socially desirable works […]."[976]

According to this copyright model, "the literary notion of the author as originator merged with Locke's economic theory of possessive individualism to produce the legal construct of the author as proprietor."[977] Bennett suggests that the concept of individualism is "related to the 'break-up of the medieval social, economic and religious order', with its feudalistic emphasis on a person's place in that relatively rigid hierarchy."[978] The concept, as Bennett further explains, is dated in the English tradition "as early as the period 1050-1200" and "fundamental to facets of classical culture."[979]

James Boyle argues that "the idea of authorship is socially constructed and historically contingent [and that] the romantic vision of authorship plays down the importance of external sources by emphasizing the unique genius of the author and the originality of the work."[980] Boyle

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974 Martha Woodmansee, "On the author effect: Recovering Collectivity" (1992) 10 Cardozo Arts & Ent LJ 279 at 280 [Woodmansee, On the author effect]: "[D]oing well what is worthy to be done, and what was never done before… for the delight, honor, and benefit of human nature." (Woodmansee cites William Wordsworth, Essay, Supplementary to the Preface, in Paul M Zall, ed, *Literary Criticism of William Wordsworth* (Lincoln: University of Nebraska Press, 1966) at 158 and 184).

975 Bridy, *supra* note 423 at 8; *The Statute of Anne 1709* reads as follows: "An Act for the Encouragement of Learning, by vesting the Copies of printed Books in the Authors, or Purchasers, of such Copies, during the Times therein mentioned." See generally Ransom, *supra* note 453 at 1709. Similarly, the *US Constitution* empowers Congress "to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." US Const art I, § 8 cl 8. It should be noted that the *Statute of Anne* affected not only the US, but Israel's copyright regime as well. Hence, the "Anne effect" is much broader than Bridy describes.

976 D'Agostino, *supra* note 408 at 47. However, as D'Agostino, *ibid* at 49, argues "the Statute was not entirely an author's statute, but more of a publisher's statute. In this period, copyright has traditionally been a publisher's right and not an author's right."

977 Bridy, *supra* note 423.

978 Bennett, *supra* note 929 at 56-57.

979 *Ibid*.

980 James Boyle, *Shamans, Software, and Spleens: Law and the Construction of the Information Society* (Cambridge, Mass: Harvard University Press, 2009) at 114 [Boyle, Shamans, Software, and Spleens].

points out to one of the core arguments within copyright law (mainly US copyright law) – does regulation of information produce too much or too little? The difficulty, as he explains, is that "the use of some general body of 'public goods theory' to analyze information issues seems to be impossible."[981] In the absence of a clear and convincing economic argument, the romantic authorship values and ideas "mixed" into the economic analysis. Thus, claims Boyle, the romantic author paradigm is influencing (and affecting) the framing of legal rights allocating rights unjustly – "those who do not look like authors find their property claims disfavored."[982] As appealing as Boyle's argument may be, it is not without flaws. There are more reasons for copyright expansion than the "romantic determinism".[983] As Vaver notes, "[t]he life of the law here is less logic or literature than lobbying."[984] Bently outlined better suspects,[985] such as corporate greed, interest groups, legislative process, property rhetoric, internationalization, national economic and trade interests. Accordingly, "[t]he romantic author was, at most, a minor accomplice."[986]

Furthermore, there is a growing understanding that the author is socially constructed,[987] and authorial creation is a collaborative process.[988] Woodmansee demonstrated it by tracing the authorship concept's evolution. As Woodmansee has shown, authorship was always a collaborative process in which authors shared their writing.[989] Jaszi identified the romantic author

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981 *Ibid* at 115.
982 *Ibid* at 116.
983 Anne Barron, "Introduction. Harmony or Dissonance? Copyright Concepts and Musical Practice" (2006) 15 Soc & Leg Stud 25. See also Lemley, Romantic Authorship, *supra* note 944 at 879, arguing that the romantic authorship cannot provide sufficient explanation for the changes in IP law.
984 David Vaver, "The Copyright Mixture in a Mixed Legal System: Fit for Human Consumption?" (2001) 5:2 Electronic J Comp L at part III, online <https://www.ejcl.org/52/art52-3.html>.
985 Lionel Bently, "R. v. the Author: From Death Penalty to Community Service - 20th Annual Horace S. Manges Lecture, Tuesday, April 10, 2007" (2008) 32 Colum J L & Arts 1 at 21-64.
986 *Ibid* at 21.
987 Woodmansee & Jaszi, *supra* note 967 at 1 and 9.
988 See Jane Ginsburg, "The Author's Place in the Future of Copyright" (2009) 153 Proc Am Phil Soc 147 [Ginsburg, The Author's Place in the Future of Copyright].
989 Woodmansee, On the author effect, *supra* note 974 at 281: "From the Middle Ages right down through the Renaissance new writing derived its value and authority from its affiliation with the texts that preceded it, its derivation rather than its deviation from prior texts."

paradigm as the main source for undermining the authorship's collaborative nature.[990] Rosemary Coombe and Zemer have both argued that intellectual products are the result of social dialogue.[991] Notable works by several prominent scholars such as Boyle,[992] Coombe,[993] Jessica Litman,[994] Drassinower[995] and others have promoted the idea of copyright as a communicative act.

Drassinower, for example, rejects copyright theory's common conceptual paradigms.[996] Drassinower, instead, relies on the internal rationality of copyright[997] and considers copyright works as acts of speech. Thus, copyright law "protects the integrity of the work as a communicative act."[998] And consequently, infringing a copyrighted work acts as compelling its author's speech. Accordingly, copyrights – like limits on communicative acts – must both accord with others' communicative rights (endorsing fair dealing policy) and must be limited specifically to communicative uses (endorsing a relaxed limit on incidental copying).[999]

Indeed, the concept of the author is changing. However, is the author really dead? Not necessarily.[1000] We should distinguish between the author in the literature (who may be dead for a

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990 *Ibid*; Peter Jaszi, "On the Author Effect: Contemporary Copyright and Collective Creativity", both in Woodmansee and Jaszi, *supra* note 967.
991 Coombe, Objects of Property, *supra* note 524; Zemer, Dialogical Transactions, *supra* note 437.
992 Boyle, Shamans, Software, and Spleens, *supra* note 980. Boyle argues for a socially constructed basis for authorship – criticizes the individualistic basis of the romantic author paradigm.
993 Coombe, Objects of Property, *supra* note 524.
994 Jessica Litman, "The Public Domain" (1990) 39 Emory LJ 965.
995 Drassinower, *supra* note 442.
996 *Ibid* at 8.
997 *Ibid* at 7.
998 *Ibid* at 8.
999 *Ibid*. See also Shyamkrishna Balganesh, "The Immanent Rationality of Copyright Law" (2017) 115 Mich L Rev 1047; Special IPJ edition (2016) and William T Gallagher, ed, "Review Symposium: Abraham Drassinower's What's Wrong with Copying?" (2017) 7:2 IP L Book Rev. It is interesting to note that a *Copyright Act* based on Drassinower's conception would have protected or acted as a defense for CBC's "ephemeral" copies in *Canadian Broadcasting Corp v SODRAC 2003 Inc*, 2015 SCC 57.
1000 Bently explains: "[A] number of attempts have been made to show that the critique of romantic authorship signified by the notion of the death of the author implies a *necessary* rethinking of the role of authorship in copyright law. If the two concepts of authorship and literary property emerged at the same time, based on common conceptions of individualism, personality and creativity, then it might be reasonable to expect the concepts to disappear at the same time." Lionel Bently, "Copyright and the Death of the Author in Literature Law" (1994) 57 Mod L Rev 973 at 976 [Bently, Copyright and the Death of the Author in Literature Law]. Ginsburg further observes: "Artistic merit has never been a prerequisite to copyright (at least not in theory), and authors are not necessarily less creative for being

while)[1001] and the legal concept of authorship, which is changing, developing, and expanding.[1002] The legal concept of authorship is still with us, and "there is plenty of evidence that copyright law continues to employ the rhetoric and conceptual underpinnings of authorship, in both the judicial and legislative arenas."[1003]

I am not willing to concede the idea that AI authorship marks the end of copyright. I believe that copyright will have an important role in the coming decades. My assumption does not preclude a conceptual change within the copyright regime. As the title for my dissertation implies – the legal boundaries of copyright require rethinking. Copyright law should become more receptive to social change (AI included). Perhaps it already is – as Jaszi's analysis indicated – on a review of two divergent US Court decisions in *Koons*.[1004]

New changes are on the horizon, especially the computer-generated works and expected AI revolution: we might live to see the death of the human author and the rise of the AI author. Woodmansee has foreseen these changes already, stating that "technology is hastening the demise of the illusion that writing is solitary and originary."[1005] Indeed, in the new technological era, the concept of the sole (romantic) author is obsolete. Even if we put aside AI authorship for a moment, we ought to consider the way humans interact with technology today. Information and data engulf

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multiple. As a result, the syllogism 'the romantic author is dead; copyright is about romantic authorship; copyright must be dead, too' fails." Ginsburg, The Concept of Authorship, *supra* note 750 at 1065.

[1001] Bently, Copyright and the Death of the Author in Literature Law, *ibid*: "Indeed, it has been argued that the death of the author in literary theory has already been paralleled by the demise of copyright and its replacement with trade marks law."

[1002] See e.g. David Saunders, *Authorship and Copyright* (London: Routledge, 1992).

[1003] Bently, Copyright and the Death of the Author in Literature Law, *supra* note 1000 at 977. Bently further provides: "The poststructuralist critique of authorship appears so far to have had no significant influence on copyright law which has continued to employ romantic images of authorship, at least in some contexts."

[1004] Jaszi, *supra* note 956 at 105: "Koons may have caught the very leading edge of a profound wave of change in the social and cultural conceptualization of copyright law-specifically, the emergence of an understanding that is at least incipiently 'postmodern' in nature." *Rogers v Koons*, 960 F (2d) 301 (2d Cir 1992) and *Blanch v Koons*, 467 F (3d) 244 (2d Cir 2006).

[1005] Woodmansee, On the author effect, *supra* note 974 at 289.

us from all sides. We use Google Images, Google Scholar, and Google Books to gather information. We enjoy unlimited sources of information on every topic and every issue. The human author of our time can easily be affected by different styles of works and creations. Advancements in technology will speed these processes even further. These unique characteristics of the new creation process make the individual author a reminiscence of the past.

The new AI authorship is a collaborative process, as Woodmansee claims. But, it is difficult to argue that it is socially constructed – computer programs are not affected by human interactions.[1006] On the other hand, the social concept itself might change: *i.e.*, we might be willing to accept a different version of social interaction, framing the "dialogue" differently. Transmitting data, for example, might indeed be considered a sort of language.[1007] AIs and humans might be able to communicate, thus creating new ways for social interactions.[1008] If we can accept non-human legal rights, we might as well accept new ways of interaction and new ways to socialize. New and innovative ways to socialize and dialogue between humans and non-humans will change the concept of authorship allowing a more inclusive way to structure constructive connections that, in turn, will affect the creative process.

3.2.2 The Human Author

Authorship is perceived as a human ingenuity-rooted concept. The *Berne Convention* defines authorship indirectly, stating that "[t]he *person* or body corporate whose name appears on a cinematographic work in the usual manner shall … be presumed to be the maker of the said

[1006] This might change in the future, however. As computer programs advance, we might expect that it would be able to adapt, change, and learn from human behaviour.
[1007] It seems that Litman, *supra* note 994 at 1014 is willing to accept this idea, albeit partially: "User interfaces are themselves languages--the languages people use to operate their computers."
[1008] As I indicated in Part I, robots are providing relief and care for the elderly today. These connections will enhance in the future, allowing both humans and robots to interact on a different level.

work."[1009] Jane Ginsburg indicates that "it is not clear that the person whose name appears must be a human being."[1010] Ginsburg shows that we can vest ownership in productions where its human input is unclear "without tricking out the owner in the garb of an author." Sam Ricketson and Adolf Dietz, however, both argued that *Berne* restricts authorship only to humans.[1011]

Seeking guidance from other jurisdictions delivers similar results. The *CDPA* deems an author as "the *person* who creates it."[1012] Australia's *Copyright Act* explicitly defines an author as the "*person* who took the photograph."[1013] The *EU Term Directive* implies a human element.[1014] Justine Pila and Andrew Christie conclude:[1015]

> *"The assumption that every literary work has a human author is undoubtedly central to the (pre-technological and industrial) theory of literary production embodied in the Anglo-Australian copyright legislation."*

1009 [Emphasis added]. *Berne*, *supra* note 565 at art 15.1. Though it should be noted that a maker is not an author under Canada's copyright laws.

1010 Ginsburg, The Concept of Authorship, *supra* note 750 at 1069. Ginsburg further suggested that the Dutch copyright laws permit the authorship of legal entities. See *Auteurswet* (*Dutch Copyright Law*) art 8: "A public institution, an association, a foundation or a company that makes a work public as its own, without naming any natural person as the maker, is taken to be the maker of that work, unless it is proved that in the circumstances the making public of the work was unlawful."

1011 Ricketson, *supra* note 795; Adolf Dietz, "The Concept of Authorship Under the Berne Convention" (1993) 155 RIDA 3. See also the discussion in Part II, chapter III(B).

1012 *CDPA*, s 9(1). However, since the last does not defines what is a "creation" the "definition does not get us very far", Ginsburg, The Concept of Authorship, *supra* note 750 at 1070.

1013 *Australia's Copyright Act 1968*, s 10. The Australian *Copyright Act* makes the distinction between works of human authorship and other subject-matters (for example, productions such as broadcast signals and sound recording). The Australian definition, however, is not very clear and leaves room for interpretation (*i.e.*, who took the picture?). Further, section 84 defines a qualified person as "an Australian citizen or a person (other than a body corporate) resident in Australia." The latter might cause some confusion in the future if AI would be deemed to be a citizen or a resident (like in the case of the AI robot Sofia, which the Kingdom of Saudi Arabia decided to bestow citizenship). I explained in the second part the ambiguity in section 9(3) of the *CDPA*, in regard to computer programs. See also Ginsburg, The Concept of Authorship, *supra* note 750 at 1070.

1014 According to Article 1: "[T]he rights of an author of a literary or artistic work … shall run for the life of the author and for 70 years after his death." Presumably, there is a connection between the most elementary human trait – death, and copyright. EU, *Commission Directive (EC) 2006/116/EC of 12 December 2006 on the Term of Protection of Copyright and Certain Related Rights*, [2006] OJ, L 372/12 at art 1 [*Term Directive*].

1015 Justine Pila & Andrew Christie, "The Literary Work Within Copyright Law: An Analysis of its Present and Future Status" (1999) 13 IPJ 133 at 156.

The US Copyright Office stated in its *Compendium of U.S. Copyright Office Practices*, that "it will refuse to register a claim if it determines that a human being did not create the work […]."[1016] Following this rationale, SCOTUS has consistently interpreted authorship as a process involving human beings or persons, restricting the authorship of non-humans.[1017]

In *Bleistein v Donaldson Lithographing Co*,[1018] Justice Holmes explained the concept of authorship as a unique quality of human personality: "The copy is the personal reaction of an individual upon nature. *Personality always contains something unique*. It expresses its singularity even in handwriting, and a very modest grade of art has in it something irreducible which is *one man's alone*."[1019]

In *Urantia Foundation v Maaherra*,[1020] Urantia Foundation claimed that Kristen Maaherra infringed its copyright by distributing a computerized version of a book. Both parties, however, agreed that the authors of the book were "celestial beings", and that these celestial beings "have delivered the teachings, that were eventually assembled in the Book, 'through' a patient of a Chicago psychiatrist, Dr. Sadler."[1021] Putting the factual argument aside, the court concluded that

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[1016] [Emphasis added]. *Compendium of US Copyright Office Practices*, *supra* note 422.

[1017] See Naruto's discussion, *supra* note 237. Abbott argued that recognizing individual rights for IP protection must include some level of awareness to the animal's contribution in the form of expected incentive/benefit or a certain connection to the creation, which the monkey in Naruto did not possess. Abbott, *supra* note 656 at 1121. See also Guadamuz, *supra* note 422 at 173; Andres Guadamuz, "The Monkey Selfie: Copyright Lessons for Originality in Photographs and Internet Jurisdiction" (2016) 5 Internet Pol'y Rev; Grimmelmann, Copyright for Literate Robots, *supra* note 847 at 658. Grimmelmann refers to Fromer and Lemley, stating that "as a general matter, however, copyright uses a hybrid test, drawing on both the perspective of the expert and that of a nonexpert observer (either the consumer or the ordinary person)." See Jeanne C Fromer & Mark A Lemley, "The Audience in Intellectual Property Infringement" (2014) 112 Mich L Rev 1251 at 1267-73.

[1018] 188 US 239 (1903).

[1019] [Emphasis added]. *Ibid* at 250. Durham opines that "the Court emphasized 'personality' as a source of originality, that 'something irreducible, which is one man's alone,' but stopped short of declaring personality the essence of authorship. Perhaps it is the "singularity" of a work, a by-product of personality, which marks it as original. If so, some works devoid of personality might take their 'singularity' from some other source – even a random source – and still qualify as original works of authorship. The Court, however, had no need in Bleistein to split hairs with such precision." Durham, *supra* note 939 at 582.

[1020] 114 F (3d) 955 (9th Cir 1997).

[1021] *Ibid* at 957. See also *Cummins v Bond*, [1927] 1 Ch 167 (Eng). In *Cummins*, the UK court held that a medium's writings – which allegedly were transmitted to her by a celestial being – is the copyright owner of her writings: "It for copyright purposes, "a work is copyrightable if *copyrightability is claimed by the first human beings* who compiled, selected, coordinated, and arranged."[1022] It is intriguing, however, to analyze the court's decision about the human element. It seems that the court tried to avoid challenging the faith of the parties (*i.e.*, arguing that there are no celestial beings and thus there has to be a human author). In avoiding this ruling, for obvious reasons, the court made an important remark:[1023]

> *"The copyright laws, of course, do not expressly require 'human' authorship, and considerable controversy has arisen in recent years over the copyrightability of computer-generated works."*

As Yanisky-Ravid argues, however, "the case can also be interpreted as lending support for the idea that the statue really does not protect works authored by non-humans."[1024] She referenced the court opinion stating that "it is not creations of divine beings that the copyright laws were intended to protect."[1025]

In *Community for Creative Non-Violence v Reid*,[1026] the Community for Creative Non-Violence (CCNV) "entered into an oral agreement with the respondent … to produce a statue dramatizing the plight of the homeless for display."[1027] The legal issue in this matter was

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was proved that the whole of the manuscript of the work was written by the plaintiff alone in her own automatic writing, and none of it was dictated by the defendant or any other living person." In establishing Cummins's authorship, the court did not dismiss the possibility of the celestial being as the source of the writings, finding that they "ought to be regarded as the joint authors and owners of the copyright, but inasmuch". However, the court is not willing to concede to the idea of assigning co-authorship right in this matter, stating that "I do not feel myself competent to make any declaration in his favour, and recognizing as I do that I have no jurisdiction extending to the sphere in which he moves, I think I ought to confine myself when inquiring who is the author to individuals who were alive when the work first came into existence and to conditions which the legislature in 1911 may reasonably be presumed to have contemplated. So doing it would seem to be clear that the authorship rests with this lady, to whose gift of extremely rapid writing coupled with a peculiar ability to reproduce in archaic English matter communicated to her in some unknown tongue we owe the production of these documents." *Ibid* at 173.

1022 [Emphasis added]. *Urantia Foundation*, *ibid* at 958. See also *Penguin Books*, *supra* note 765, contending that a religious book (The Course) is not an original work but a work of Jesus.

1023 *Urantia Foundation*, *ibid*.

1024 Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 719.

1025 *Urantia Foundation*, *supra* note 1020 at 958.

1026 490 US 730 (1989).

1027 *Ibid* at 730.

established, under the work made for hire doctrine, who the owner of the sculpture is.[1028] In addressing the question of authorship, SCOTUS opined that "the Copyright Act of 1976 provides that copyright ownership 'vests initially in the author or authors of the work' ... As a general rule, the author is the party who actually creates the work, that is, *the person* who translates an idea into a fixed, tangible expression entitled to copyright protection."[1029]

In *Aalmuhammed v Lee*,[1030] a case involving the 1992 biographical drama film *Malcolm X,*[1031] Jefri Aalmuhammed claimed to be a "co-creator, co-writer, and codirector of the movie."[1032] In rejecting Aalmuhammed's claim of co-authorship, the court defined authorship by stating that an author "[…] *will likely be a person* 'who has actually formed the picture by putting the persons in position, and arranging the place where the people are to be – the man who is the effective cause of that', or 'the inventive or master mind' who 'creates, or gives effect to the idea'."[1033]

The contemporary "common sense" that presumes the author to be a living, breathing, thinking being rested on these earlier cases and conceptions. As Bridy concludes, SCOTUS has[1034]

> *"defined authorship and copyright in broadly humanistic terms, citing the Framers'*

[1028] See *ibid*: "The parties, who had never discussed copyright in the sculpture … filed competing copyright registration certificates. The District Court ruled for CCNV in its subsequent suit seeking, inter alia, a determination of copyright ownership, holding that the statue was a 'work made for hire' as defined in the Copyright Act … and was therefore owned exclusively by CCNV … The Court of Appeals reversed, holding that the sculpture was not a 'work made for hire' … since it was not 'prepared by an employee within the scope of his or her employment' in light of Reid's status as an independent contractor under agency law. The court also ruled that the statue did not satisfy the second subsection of the § 101 definition … since sculpture is not one of the nine categories of 'specially ordered or commissioned' works enumerated therein, and the parties had not agreed in writing that the sculpture would be a work for hire."

[1029] [Emphasis added]. *Ibid* at 737.

[1030] 202 F (3d) 1227 (9th Cir 2000).

[1031] Wikipedia, "Malcolm X (1992 film)" (last edited 3 August 2018), online: <en.wikipedia.org/wiki/Malcolm_X_(1992_film)>.

[1032] *Aalmuhammed*, *supra* note 1030 at para 7. Denzel Washington, the lead star, asked Aalmuhammed to assist him in preparing for the movie. In doing so, Aalmuhammed claimed that he made many changes to the script and thus should be considered a co-author.

[1033] [Emphasis added]. *Ibid* at para 22. The court relied on *Burrow-Giles*, *supra* note 715.

[1034] Bridy, *supra* note 423 at 10, quoting *Burrow-Giles*, *ibid* at 57-58. In *Burrow-Giles* and later *Bleistein v Donaldson Lithographing Co*, *supra* note 1018, SCOTUS, explains Bridy, *ibid* at 12, "augmented its early jurisprudence of authorship, but departed from the developing focus on creativity and genius."

reliance on English Law: an author is 'he to whom anything owes it origin; originator; maker; one who completes a work of science or literature'; copyright is 'the exclusive right of a man to the production of his own genius or intellect'."

Hence, for AI to be regarded as an author in law, it is essential to disconnect the authorship concept from assumptions about individualism and current perceptions of creation as a human monopoly.

As I stated earlier, a work of authorship is not an individualized process; no author is a sole genius. "Works of authorship, whether the result of years of study and labour or of a sudden leaps of spontaneous insight, begin with what has been done in the past, and they go beyond the past in logical and understandable ways."[1035]

Zemer claims that copyright law allows "disproportionate enclosures of portions of the general public domain, of social symbols and cultural elements fundamental to the development of society and its members."[1036] If we accept this argument, it is possible to move forward to establish a more reasonable balance between the author – any author, human or non-human – and the public domain.

Furthermore, if we take into consideration recent developments in technology, we can assume future AI will possess some level of inter-connection, otherwise known as a hive mind. My assumption is based on the way our technology is connected today. Almost all computers (and smartphones) are connected through the Internet. Software is updated on a routine basis, almost independently. Hence, we might assume that future technology will establish hive mind interactions like what exists today. In doing so, the concept of individual creation will become a remnant of a different era. AI will be able to produce or acquire new creations at any moment,

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[1035] Zemer, *The Idea of Authorship*, *supra* note 526 at 73.
[1036] *Ibid*. See also Steven Wilf, "Who Authors Trademarks?" (1999) 17 Cardozo Arts & Ent LJ 7.

instantly creating new adaptations and sharing creations with other AI. The reality might work differently: AI might be unwilling to share or prepared to do so only under certain conditions.

3.2.3 Resolving AI Data Barriers[1037]

3.2.3.1 Presenting the Challenges

We usually focus on *output* – the work itself – when discussing creative machines. As a result, we ignore *input*: the data gathered and processed by programs or engineers.[1038] In previous parts, I introduced IP theories that support looser IP restrictions to maximize social and cultural engagement. In this chapter, I will consider AI input and address data barriers.

AI and machine-learning algorithms require a massive amount of data to develop.[1039] Facebook, Amazon, Google, Microsoft, and other companies are gathering data, indexing pictures, videos and messages to improve their search, translation and commercial algorithms. Yet, the mere availability of data is not enough. AI needs *good* data. Incomplete or biased data can exacerbate problems.[1040]

[1037] I am aware that there are other considerations such as data privacy and trade secrets. However, I choose to focus on concerns relating mostly to copyright. For further reading on data privacy see Giuseppina D'Agostino & Dionne A Woodward, "Diagnosing Our Health Records in the Digital World: Towards a Legal Governance Model for the Electronic Health Record in Canada" (2010) 22 IPJ 127.

[1038] "Data" is simply a set of values of qualitative or quantitative variables. In referring to data in the context of AI or machine-learning, I usually mean "Big Data" (*i.e.*, complex datasets, either structured, unstructured or semi structured). See e.g. David Debenham, "Big Data Analytics, Big Financial Institutions, and Big Money Fraud Litigation" (2016) 32 BFLR 103.

[1039] Thomas Margoni identify the steps required to develop AI training database, which, as he indicates, might vary. See Thomas Margoni, "Artificial Intelligence, Machine learning and EU copyright law: Who owns AI?" (2018) CREATe Working Paper 2018/12.

[1040] Amanda Levendowski argues that copyright laws limits access to data and encourages AI companies to use low-quality data (BLFD – biased, low friction data). See Levendowski, *supra* note 224 at 589.

Good data, however, might be copyrighted,[1041] which poses a problem: where the AI's input infringes copyright, the output may infringe too.[1042] Indeed, not all data is copyrightable. Facts and raw data are usually ineligible for copyright protection.[1043]

AI can infringe copyright on several different levels:

1. Making digital copies of copyrighted works and saving them on either the hard drive or the "cloud". To date, however, courts "have yet to confront whether unauthorized copies made for training AI are necessarily infringing copies;"[1044]
2. Modifying data in a way that creates a derivative work;[1045] or

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[1041] Access to data could also be inhibited by privacy laws and anti-circumvention of technological protection measures (TPM). In this chapter, however, I will focus mainly on related copyright issues.

[1042] See e.g. CONTU, *supra* note 621 at 46: "The unlawful use of a program or data base might limit or negate the author's claim of copyright in the ultimate work, just as the failure of a translator to obtain a license from the proprietor of the translated work might prevent securing copyright in and making use of the translation."

[1043] See e.g. Vaver, *supra* note 237 at 92: "The raw facts or data by themselves, especially where collected from other sources, are not copyright […]." See also *CCH*, *supra* note 440 at para 212; *Nautical Data International, Inc v C-Map USA Inc*, 2013 FCA 63 at para 11; *Maltz v Witterick*, 2016 FC 524 at para 29. It is not always easy to distinguish between types of data (*i.e.*, factual uncopyrighted data and developed or creative data, which is copyrightable). In *GSI*, *supra* note 781 at para 43, the court differentiated between raw and processed data. And although the court found that the data was protected as a compilation, it did not rule out the possibility of protecting processing data as well: "One ping from a hydrophone would not suffice; it is the collection, arrangement, distillation and compilation that creates the work – both at the raw data level and then at the more refined processed data level." *GSI*, *ibid* at 77. Indeed, a compilation of data is copyrightable. See Vaver, *supra* note 237 at 92.

[1044] Levendowski, *supra* note 224 at 595. A recent law suit that was filed in Montreal might challenge this assumption. In that suit the plaintiffs, artist Amel Chamandy and Galerie NuEdge Fine Arts, claimed that the defendant, Adam Basanta, infringed Chamandy "Your World Without Paper" painting by using the painting image as part of a database Basanta created to compare between his computer-generated images to contemporary works. The defendant describe the process in his website: "Each newly created image is then analyzed by a series of deep-learning algorithms trained on a database of contemporary artworks in economic and institutional circulation. When an image matches an existing artwork beyond an 83% match, it uploads it to this website and a twitter account." See <allwedeverneed.com/about.html>. See Teresa Scassa, "Artist sued in Canada for copyright infringement for AI-related art project" (4 October 2018), online (blog): *Teresa Scassa* <www.teresascassa.ca/index.php?option=com_k2&view=item&id=286:artist-sued-in-canada-for-copyright-infringement-for-ai-related-art-project>.

[1045] *Copyright Law of the United States*, *supra* note 627 §§ 106(1) and (2). The SCC, for example, upheld a trial court decision that the "burning" of Apple's program on silicon chips is a "translation and an exact reproduction of the assembly language program", infringing Apple's copyright. Hence, "translating" of copyrighted data might constitute an infringement as well. *Apple Computers v Mackintosh Computers*, [1990] 2 SCR 209, 110 NR 66. The silicon chips were protected under section 3 of the *Copyright Act*, RSC 1985, *supra* note 590. Even a temporary reproduction might constitute infringement under Canadian copyright law, *Canadian Broadcasting Corp*, *supra* note 999. See also Margoni, *supra* note 1039 at III.3.a: "Three types of derivative works are specifically regulated by the Berne Convention: translations, arrangements of music, and adaptations and other alterations … Whether the term language includes only 'traditional' human languages, or also includes modern forms of 'artificial' languages such as computer

3. Gathering data using programs (crawlers),[1046] or a text and data mining (TDM) process that can extract information such as photographs[1047] and e-books.[1048]

In the last case, part of AI-mined data might be copyrighted,[1049] even if unprotected by other means like through a contract, trade secrets or privacy laws.[1050] In *Century 21 Canada Limited Partnership v Rogers Communications Inc*, for example, the British Columbia Supreme Court held that Zoocasa (a wholly owned subsidiary of Rogers) infringed Century 21's terms of use by scraping its real estate listings from the website and incorporating them into a real estate search engine.[1051] In discussing fair dealing, however, the court held that there is no need to *ask* for permission to render a dealings as "fair".[1052] On the other hand, scarping the Internet to gather data

programming languages is ultimately a matter to be decided by domestic law, but in principle not incompatible with Berne's broad definition."

[1046] A crawler (or spider) is an algorithm that searches the web for indexing purposes.

[1047] From online newspapers or other sources available online. Facial recognition algorithms require million of photographs for training purposes. These photographs might be copyrighted.

[1048] Google feed its AI algorithm with book novels in order to improve its Gmail Smart Reply program, which is an AI-powered service that generate automatic responses to emails. Peter Dockrill, "Google Is Making Its AI Binge-Read Thousands of Romance Novels to Get a Little Warmer" (6 May 2016), online: *Science Alert* <sciencealert.com/google-is-making-its-ai-binge-read-thousands-of-romance-novels-to-get-a-little-warmer>. These usages might constitute an infringement of the author's copyright depending on the applicability of the fair use/dealing defense. In *Authors Guild v Google Inc*, 804 F (3d) 202 (2nd Cir 2015) the court ruled in favour of a search engine by Google Books. However, the legal position might change in the future. Further, there are several differences between Google Books' service and a given database such as the one Smart Reply used. The fair use reasoning can be stretched to a point. It might not be normatively justified to allow Google to use its Google Books library (or its unlimited data resources) to train AI for commercial purposes.

[1049] There are different ways in which data could be gathered and indexed. If, as Sobel explains, the engineers strip most of the photographs' original expression (cropping only the faces in low resolution, keeping the photographs in a contained database), chances are that the courts would exempt the usage of the photographs in the database. However, these assumptions are based on the current legal framework, which might change in the future. Given the high value of these databases there is an argument to be made for claiming royalties for selling or licensing the database. Benjamin L W Sobel, "Artificial Intelligence's Fair Use Crisis" (2017) 41 Colum J L & Arts 45 at 67-68.

[1050] Data protection laws prevent sharing spesefic information without consent (*i.e.*, medical data). See e.g. *Privacy Act*, RSC 1985, c P-21; *Personal Information Protection and Electronic Documents Act*, SC 2000, c 5.

[1051] *Century 21 Canada Limited Partnership v Rogers Communications Inc*, 2011 BCSC 1196, 338 DLR (4th) 32. See also Denise Brunsdon, "Dating Sites Scrape Internet for Women's Photos, Including Those of Deceased" (5 December 2013), online (blog): *IPilogue* <iposgoode.ca/2013/12/dating-sites-scrape-internet-for-womens-photos-including-those-of-deceased>.

[1052] *Century 21*, *ibid* at para 252: "The issue of fair dealing only arises where there is no consent to the activity complained of. The fact that consent has not been given, or has been refused, whether orally or in writing or in a robots.txt file, is only the starting point for a fair dealing analysis. It is not the end point for an analysis of fair dealing. The test is the character of dealing not the dealing without consent." Yet, in *1395804 Ontario Ltd (Blacklock's Reporter) v Canada (Attorney General)*, [2017] 2 FCR 256 at para 37, 2016 FC 1255, the court held that "the deliberate (like photos) for commercial purposes might be excluded as a form of research under fair dealing,[1053] making fair dealing for most AI or machine learning companies unattainable.

There are several differences between human and computer-generated/AI infringement.[1054] For one, it is difficult to establish whether a human creator explicitly copied a work instead of merely being influenced or inspired by similar works and authors. By contrast, computer programs (and most likely AI as well) store and index data in an orderly manner, making it easier to investigate any alleged infringement.[1055] Indeed, determining infringement might seem plausible when examining current computer-programs works. AI and machine-learning algorithms can even be coded to target specific usages, to locate potential infringements and issue cease-and-desist letters, and even to block access for certain violating companies or individuals.[1056]

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breach of the accepted terms of access to and use of copyrighted material, whether protected by a paywall or not, is a relevant consideration in applying the fair dealing provisions of the Act."

1053 *Trader Corp v CarGurus, Inc*, 2017 ONSC 1841 at para 38. In *Trader Corp*, the respondent, CarGurus, indexed and scraped dealers' websites using crawls to extract vehicle photos, which Trader Corp owned. In addressing fair dealing defence, Judge Conway stated: "I am not persuaded that CarGurus' use of the Trader Photos is 'fair'. At this stage of the analysis, CarGurus's own purpose may be considered – that purpose was strictly a commercial one. The character of the dissemination of the Trader Photos was unfair, in that they were widely disseminated through the Internet for the entire life of the vehicle listing. The entire photo was displayed, not just a portion of it."

1054 Under copyright law, the plaintiff could argue that the defendant's work exhibits substantial similarity to the plaintiff's original creation. The courts then can examine the work and investigate whether the defendant had access to the work to establish the probability of copying.

1055 Sobel, *supra* note 1049 at 65-66. Sobel explains: "The vagaries of the human brain have led to some awkward rulings: George Harrison was found to have 'subconsciously' copied a song by the Chiffons, and a jury found that the singer Michael Bolton had access to an obscure Isley Brothers song because it was played on radio and television in the areas where Bolton lived as an adolescent, nearly three decades before he released an allegedly infringing song." See also *Three Boys Music Corp v Bolton*, 212 F (3d) 477 (9th Cir 2000); *Bright Tunes Music Corp v Harrisongs Music*, *Ltd*, 420 F Supp 177 (SDNY 1976).

1056 Using algorithm-based capabilities and other programs to detect suspicious anomalies is not new. See e.g. Antonio Capobianco, Pedro Gonzaga & Anita Nyeső, *Algorithms and Collusion - Background Note by the Secretariat* (OECD, 2017); Ariel Ezrachi & Maurice E Stucke, *Algorithmic Collusion: Problems and Counter-Measures* (OECD, 2017). On the complexities that algorithms create for competition law see also Ariel Ezrachi & Maurice E Stucke, *Virtual Competition: The Promise and Perils of the Algorithm-Driven Economy* (Cambridge: Harvard University Press, 2016). Korea's Trade Commission, for example, is using BRIAS – an automatic quantitative analysis system – to detect bidding anomalies and preventing bid-rigging conspiracies. Michal Gal and Niva Elkin-Koren also suggested using algorithms to empower consumers to maximize profits. See Michal S Gal & Niva Elkin-Koren, "Algorithmic Consumers" (2017) 30:2 Harv JL & Tech 309. In a different paper, Elkin-Koren argues that the fair use doctrine should be embedded in those systems. See Niva Elkin-Koren, "Fair Use By Design" (2017) 64 UCLA L Rev 1082.

But, mere presence of a specific song or style within a computer program should not necessarily imply infringement. Take, for example, an AI designed to learn a user's personal preferences and compose tailored songs and music from its access to all the songs available on Spotify.[1057] It would be challenging to prove that the AI's music derived from any specific song(s): "All funk songs bear a debt to James Brown, so it would not be altogether surprising if the funky Al generated output that was substantially similar to his work."[1058] Further, the same legal reasoning could be applied to humans and non-humans alike. As Woodmansee Coombe, Zemer, and others have argued, human creation is influenced by cultural perceptions, other creations, and experiences, as well as affected by a constant dialogue – it is not a work of sole genius.[1059] The same inspiration and social structures could and should be applied to AIs.

A different set of challenges revolves around access and the availability of and to data. Levendowski argues that the current legal regime renders the AI market accessible only to dominant AI developers like Apple, Facebook, Google, IBM, Microsoft, and Amazon.

Small companies that cannot acquire good data or are unwilling to face expensive legal battles in using copyrighted data, might choose not to enter the AI market or to use low-quality data resulting in poor AI programs.[1060]

Levendowski explains that low-quality data often demonstrate bias. For example, using public domain works from the early 1920s reflects the dominance of the Western white male and

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[1057] Spotify is a music streaming service.
[1058] Sobel, *supra* note 1049 at 66. As Sobel notes: "Because creativity is cumulative, rather than *ex nihilo*, a work can bear the mark of works that its author has not encountered firsthand."
[1059] Zemer, Dialogical Transactions, *supra* note 437. See also Coombe, *supra* note 541.
[1060] Levendowski, *supra* note 224. Levendowski explains, at 609: "[A] newcomer would find it nearly impossible to build something approaching the vastness of Facebook's build-it model. And it is equally unlikely that said newcomer could strike a licensing deal comparable to Google's agreement with global news agencies or a partnership equivalent to IBM's buy-it model. Without the resources to get the vast amounts data easily acquired by major AI players, meaningful competition becomes all but nonexistent."

creates biases against blacks, women, the LGBTQ community and other disadvantaged or minority groups.[1061] A program using such works would also lack a basic understanding of common modern phrases and would apply different meanings to day-to-day terms. For example, AI companies would find limited use in *The Adventures of Huckleberry Finn* or Bessie Smith's song *Baby Won't You Please Come Home* for analyzing current consumer trends.

Alternatives to public domain data are available by developing independent creations or using works under universal licensing and Creative Commons (*e.g.*, machine-readable data on Wikipedia). These alternatives risk being insufficient or providing low-quality data.[1062] Database creation is costly, so big players who already control abundant data are strengthened by these availability and accessibility issues.[1063] Thus, a small start-up AI company is less likely to find investors willing to invest in creating a database.

3.2.3.2 Exemptions for AI Data

Several jurisdictions have introduced TDM exemption legislation. As with other legal issues described in this dissertation, however, TDM policies diverge between countries:

- In the UK, the IPO defines TDM as "[t]he use of automated analytical techniques to analyse text and data for patterns, trends and other useful information."[1064] In 2014, the UK amended the *CDPA* to include a non-commercial research exemption.[1065]

[1061] Given that in Canada works are protected for only 50 years plus the death of the author, we can expect better quality of data in Canada. It should be noted that the new agreement between the US-Mexico-Canada (USMCA) expects to extend copyright protection to 70 years.
[1062] Take Wikipedia for example – the vast majority of its content editors are male, making its data potentially biased against women. Wikipedia, "Gender bias on Wikipedia" (last edited 5 October 2018), online: <en.wikipedia.org/wiki/Gender_bias_on_Wikipedia>.
[1063] Nevertheless, these data might also be biased since it is reliant on users and thus do not include communities that do not use Facebook or Google.
[1064] UK, "Guidance Exceptions to Copyright" (12 June 2014), online: *IPO* <gov.uk/guidance/exceptions-to-copyright>.
[1065] UK, *The Copyright and Rights in Performances (Research, Education, Libraries and Archives) Regulations 2014*, SI 2014/1372, s 3(2)(1)(a). Incorporating section 29A of the *CDPA*: "The making of a copy of a work by a person

- In 2016, the EU Commission introduced a new *Directive on Copyright in the Digital Single Market*,[1066] which included an exemption for TDM.[1067] The directive also offered changes to EU's copyright laws, expecting to impose greater restrictions on users' rights.[1068]
- Both Germany and France include in their copyright statutes non-commercial TDM exemptions for scientific and research purposes.[1069]
- As part of Japan's AI and innovation initiatives, it amended its copyright law in 2010 to include a broad exemption which appears to include both commercial and non-commercial uses and is not limited to research and scientific purposes.[1070]

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who has lawful access to the work does not infringe copyright in the work provided that- (a) the copy is made in order that a person who has lawful access to the work may carry out a computational analysis of anything recorded in the work for the sole purpose of research for a non-commercial purpose." Notice that the exemption does not apply to databases. Discussing UK's fair dealing doctrine, Bently & Sherman, *supra* note 406 at 224, explain that "the dealing must be fair for the purpose of research or private study, criticism or review, quotation, the reporting of current events, parody or 'illustration for instruction'. As such, it is irrelevant that the use might be fair for the purpose not specified in the Act, or that it is fair in general." Under the UK fair dealing doctrine, the test "does not depend on the subjective intentions of the alleged infringer" (an objective approach). Fairness "is said to be a question of degree and impression", which is determined according to several factors such as the amount of work that was taken (quantity and quality), the use that was made by the user (this correlates with the US fair use transformative factor – a defendant that can show that the dealing was transformative has a stronger case; on the other hand, a commercial use of the dealing weigh against the defendant), consequences of the dealing (market impact), whether the work was published or not (if the dealing is in relation to an unpublished work it weigh against a fair dealing), *etc*. Several considerations might affect a ruling regarding machine-learning and AI. For example, using pictures for creating a data corpus for machine-learning algorithms – the amount that would be taken might weigh against considering this *corpus* as fair dealing; on the other hand, the quality of the data might be very poor.

[1066] EU, *Commission Directive (EC), 2016/0280 (COD) Proposal of 14 September 2016 for a Directive of the European Parliament and of the Council on Copyright in the Digital Single Market* [*Copyright in the Digital Single Market Directive*].

[1067] *Ibid* at art 3.

[1068] Article 13, for example, was rejected by the EU Parliament.

[1069] France, *Intellectual Property Code*, art L 122-5, 10 (for works) and art L 342-3 and 5 (for databases). French copyright laws exempt only using lawful sources that made available with the consent of the owners. Meaning, if the owners prohibit using data for AI training or other purposes (in its website terms of use for example) – the exemption does not apply. Germany exemption entered into force in March 2018. *Urheberrechtsgesetz*, art 60d enables TDM for non-commercial scientific research. For further reading about TDM exemptions in the EU's countries see EU, *The Exception for Text and Data Mining (TDM) in the Proposed Directive on Copyright in the Digital Single Market – Legal Aspects* (2018), online (pdf): <http://www.europarl.europa.eu/RegData/etudes/IDAN/2018/604941/IPOL_IDA(2018)604941_EN.pdf>.

[1070] Japan, *Copyright Act*, Act No 48 of 1970, art 47: "A person that, without prejudice to the right provided for in Article 25, publicly exhibits the original copy of an artistic work or photographic work, may print such work in pamphlets for the purpose of explaining or introducing the work to persons viewing it."

- The US's and Canada's standing on these issues is a bit more complex, though, as I explain below, TDM might be exempted as fair use or fair dealing at least until a better legislative framework is put in place.

Courts view computer-programs and machine output as mechanical, routine, and generally uncreative or unoriginal.[1071] These perceptions are rooted in the legal community and reflected in the history of software copyright protection.[1072] Such perceptions might be changing as evidenced by CONTU and the subsequent amendment to the *US Copyright Act* in 1980. The question is whether current legal regimes will accommodate technological progress in the foreseeable future. Given the impact of data on AI's progress, any legal changes to tighten or loosen data barriers will affect AI research significantly.

Fair use and fair dealing doctrines are prominent legal mechanisms that could enable copyrighted work use, without the need for an author's or owner's explicit authorization to do so.[1073] Admittedly, their interpretation and rules differ across jurisdictions. The basic principle, however, is closely linked: Copyrighted material can be used in circumstances otherwise considered infringement.

Data exemptions in the US are governed mostly by its court-developed fair use doctrine.[1074] In several prominent cases since the early 1990s, the American courts rendered a use as "fair" if it was transformative, or in other words – it created something useful and different.[1075]

[1071] See the discussion in part II, Ch. II(B): *The Present: From Computer-Assisted to Artificial Intelligence*.
[1072] Sobel, *supra* note 1049 at 51: "[R]eactions to new expressive technologies, in court or the culture at large, reveal a belief that machines cannot in themselves impart, apprehend, or evince authorial expression." As Sobel further expresses: "Just as copyright treats machines as too dumb to count as authors, it also treats machines as too dumb to count as readers."
[1073] Levendowski, *supra* note 224 at 619-622. Although, as I have shown, some jurisdictions include an owner's permission (or lack of) as part of the fairness analysis.
[1074] *Copyright Law of the United States*, *supra* note 627 § 107.
[1075] *Campbell v Acuff-Rose Music, Inc*, 510 US 569 at 579 (1994) [the "Pretty Woman" case or *Campbell*].

In *Sega v Accolade*,[1076] the Ninth Circuit ruled against Sega and found that Accolade's "intermediate copying" was fair use. The court held that[1077]

> *"[A]lthough Accolade's ultimate purpose was the release of Genesis-compatible games for sale, its direct purpose in copying Sega's code … was simply to study the functional requirements for Genesis compatibility so that it could modify existing games and make them usable with the Genesis console."*

Kelly v Arriba and *Perfect10 v Amazon* followed the same reasoning;[1078] both Ninth Circuit Courts held that when search engines like Google use thumbnail (small images) display of copyrighted images from other websites – while hyperlinking to those sites – this constituted fair use.[1079] Google Images and Google Books applications have also been exempted on similar grounds.[1080] In the recent case of *Authors Guild* case, the court held that the "[s]nippet view … does not threaten the rights-holders with any significant harm to the value of their copyrights or diminish their harvest of copyright revenue."[1081]

[1076] *Sega Enterprises*, *supra* note 848. Sega claimed that Accolade (the defendant) developed compatible games (Sega developed the "Genesis" consulate and licensed the consulate to developers) by reverse engineering their consulate.
[1077] *Ibid* at para 46.
[1078] Sobel, *supra* note 1049 at 52. *Kelly v Arriba Soft Corp*, 336 F (3d) 811 (9th Cir 2003); *Perfect 10, Inc v Amazon.com, Inc*, 508 F (3d) 1146 (9th Cir 2007). Sobel explains, *ibid* at 53, that "both decisions doubled down on the rhetoric of non-expressive machinery. The defendants' image search engines assembled photographs into 'tool[s]' – mere machines – not vehicles for conveying expression." In *Kelly*, for example, "[t]he dispositive element of Kelly's fair use finding was Arriba's lack of artistic purpose in reproducing Kelly's images. While Kelly's photographs are 'artistic works intended to inform and to engage the viewer in an aesthetic experience'."
[1079] *Perfect 10, supra* note 1078. Since then, Perfect 10 sued several companies without much success. In the last case, *Perfect 10, Inc v Giganews, Inc*, No 15-55500 (9th Cir 2017), the court affirmed the District Court ruling against *Perfect 10*.
[1080] Grimmelmann, Copyright for Literate Robots, *supra* note 847 at 665; *Authors Guild*, *supra* note 1048.
[1081] Leave to appeal was denied in April 2016. However, in the recent *Fox News Network LLC v TVEyes, Inc*, No 15-3885(L) at para C (2nd Cir 2018), the Second Circuit rejected TVEyes's fair use defense by distinguishing Google's Book case on the basis that "[w]hile the [Google Books] snippets allowed a user to judge whether a book was responsive to the user's needs, they were abbreviated to ensure that it would be nearly impossible for a user to see a meaningful exposition of what the author originally intended to convey to readers."

It is important to highlight the differences between *Authors Guild*, *Perfect10*, and *Kelly*.[1082] In *Authors Guild*, the court was willing to establish fair use in cases where harm to the plaintiff's market might arise, stating that "the possibility, or even the probability or certainty, of some loss of sales does not suffice to make the copy an effectively competing substitute that would tilt the weighty fourth factor in favor of the rights holder in the original."[1083] Also, in *Authors Guild*, the amount and substantiality of the portion taken from the work did not change the outcome. Levendowski suggests that courts are willing to accept "[c]reating wholesale copies of copyrighted literary and visual works … when those works are not exposed to the public."[1084]

Other factors should be considered in analyzing fair use, like the commercialized nature of the work.[1085] Such consideration should, however, weigh against the work's transformative nature as Justice Souter emphasized in *Campbell v Acuff-Rose Music*: "[T]he more transformative the new work, the less will be the significance of other factors, like commercialism, that may weigh against a finding of fair use."[1086] D'Agostino explains that while establishing fair use might sometimes be difficult "there is flexibility with emerging technologies."[1087]

[1082] There is a difference between using a thumbnail (that can also direct users to the website it is derived from) to being able to enjoy parts of books in a way that might harm potential buyers. The Google Books user can read parts of the books and decide not to purchase the book. See *Authors Guild*, *supra* note 1048 at 224: "We recognize that the snippet function can cause some loss of sales. There are surely instances in which a searcher's need for access to a text will be satisfied by the snippet view, resulting in either the loss of a sale to that searcher, or reduction of demand on libraries for that title, which might have resulted in libraries purchasing additional copies."

[1083] *Authors Guild*, *ibid*; Sobel, *supra* note 1049 at 55; Levendowski, *supra* note 224 at 629. Judge Parker bluntly stated in *Authors Guild v HathiTrust*, 755 F (3d) 87 at 100 (2nd Cir 2014): "Lost licensing revenue counts under Factor Four only when the use serves as a substitute for the original and the full-text-search use does not." Levendowski, concludes that in "[u]sing copyrighted works as training data for AI systems is not a substitute for the original expressive use of the works."

[1084] Levendowski, *supra* note 224 at 628. The SCC expresses a similar view in *CCH*, *supra* note 440 at para 58: "Although certainly not determinative, if a work has not been published, the dealing may be more fair in that its reproduction with acknowledgement could lead to a wider public dissemination of the work — one of the goals of copyright law."

[1085] As D'Agostino, *supra* note 408 at 36 observes: "Today, in the US, there is no presumption against fair use if the defendant makes a commercial use. Commercial uses tend to weigh in favour of the plaintiff."

[1086] *Campbell*, *supra* note 1075.

[1087] D'Agostino, *supra* note 408 at 40.

Canada lacks an explicit exemption for TDM or AI training.[1088] Thus, TDM are governed by the fair dealing doctrine, as developed by a series of SCC, the Federal Court of Appeal, and Copyright Board decisions. Recently, as part of section 92 review of the *Copyright Act*, several companies, scholars and industry leaders have submitted briefs advocating for amending the *Copyright Act* to include either a broader fair dealing doctrine or an AI training/TDM exemption.[1089]

Under Canada's *Copyright Act*, a dealing is fair because "the purpose of research, private study, education, parody or satire does not infringe copyright."[1090] The SCC has long held that fair

[1088] Under *Copyright Act*, RSC 1985, s 30.71, temporary reproduction of a work or other subject matter (like data) would not constitute an infringement. This exception might enable the usage of data as part for AI training purposes. However, it is debatable whether the data could indeed be temporarily and not integrated into the AI code. First, it is difficult to maintain which data is copyrightable and which is not. Second, as Element AI (an AI company based in Toronto) argued recently, given that "informational analysis provides inputs to other technical processes such as iterative learning by AI algorithms, it may not always be clear when copies need to be destroyed." ElementAI, "Promoting Artificial Intelligence in Canada: A Proposal for Copyright Reform" (3 October 2018) at 4-5, online (pdf): <www.ourcommons.ca/Content/Committee/421/INDU/Brief/BR10078507/br-external/ElementAI-e.pdf>. See also recital 15 of the *Software Directive*, *supra* note 641 (translation, adaptation or transformation of the computer program code constitute an infringement, unless these steps are required "to achieve the interoperability of an independently created program with other programs"). The *Software Directive* subject the rights of a computer program author to the exceptions stated in arts 5 (Exceptions to the restricted acts) and 6 (Decompilation). For further reading see Margoni, *supra* note 1039 at III.3.b.1.

[1089] See IP Osgoode, "Submission to the Standing Committee on Industry, Science and Technology for the Statutory Review of the Copyright Act" (10 December 2018), online (pdf): <www.ourcommons.ca/Content/Committee/421/INDU/Brief/BR10269431/br-external/DagostinoGiuseppina-e.pdf>. ElementAI, *ibid* at 3, stated, for example, that "[a] targeted exemption within the Copyright Act (Act) to allow for informational analysis would help secure a predictable legal environment for Canada's Artificial Intelligence (AI) ecosystem to both continue its unprecedented growth and reach competitive maturity." Microsoft further suggested to "[d]raft the new exceptions to clarify that the techniques of machine learning involving copying analyzing, and using lawfully acquired works protected by copyright to develop new knowledge – are permitted and require no authorization of the copyright owner, and by any entity or individual for lawful purposes." See Microsoft, "Submission of Microsoft to the Standing Committee on Industry, Science and Technology on the 2018 Statutory Review of the Copyright Act" (4 September 2018) at 7, online (pdf): <www.ourcommons.ca/Content/Committee/421/INDU/Brief/BR10008894/br-external/MicrosoftCanada-e.pdf>. Others have supported a broader fair dealing doctrine, see e.g. Pascale Chapdelaine et al, "Brief - Statutory Review of the Copyright Act submitted by Pascale Chapdelaine, on behalf of Canadian intellectual property law scholars" (20 November 2018) online (pdf): <www.ourcommons.ca/Content/Committee/421/INDU/Brief/BR10166923/br-external/ChapdelainePascale01-e.pdf >.

[1090] *Copyright Act*, RSC 1985, *supra* note 590, s 29. Fair dealing is confined to the enumerated purposes listed in the act.

dealing should not be interpreted restrictively. Canadian courts have instead chosen to strengthen user's rights and emphasize fairness's importance.[1091]

Further, a Canadian use's commercial nature is considered as a factor, but it is not determinative. As Vaver stated, "[r]search purposes are not restricted to private purposes. Non-private or commercial research … can therefore qualify as fair dealing."[1092] Nevertheless, as noted by the SCC: "[R]esearch done for commercial purposes may not be as fair as research done for charitable purposes."[1093]

Determining whether a user has taken a "substantial part" is an essential part of the fair dealing analysis. The test to find if a substantial part was taken includes both quantitative and qualitative factors. While none of the factors are determinative, qualitative factors are more important and might weigh against fair dealing in Canada, in cases where massive amounts of copyrighted data feed the algorithms.

In the future, courts might limit fair dealing's applicability to TDM-related cases to force the parties to bargain for royalty agreements. If data is equivalent to currency and quality data is high-value, there might be a normative justification to motivate the parties to negotiate for a "fair" use. The recent *York University* decision might illustrate a move in that direction.[1094]

[1091] *CCH*, *supra* note 440; Vaver, *supra* note 237 at 233-244. In determining fair dealing, the courts address the following: the purpose of the dealing, nature if the sourced work, how much and what was used, the effect on the market and whether there are easy alternative available. Giuseppina (Pina) D'Agostino, "Healing Fair Dealing? A Comparative Copyright Analysis of Canadian Fair Dealing to UK Fair Dealing and US Fair Use" (2008) 53 McGill LJ 309 (D'Agostino offers several suggestions to remedy fair dealing in Canada).

[1092] Vaver, *ibid* at 240.

[1093] *CCH*, *supra* note 440 at para 54. See also *Trader Corp*, *supra* note 1053. Further, from a normative perspective, there are justifications for limiting access to free data for commercial purposes and allowing access for social causes. For an interesting discussion about artificial intelligence and social good, see Gregory D Hager et al, *Artificial Intelligence for Social Good* (Computing Community Consortium (CCC), 2017), online (pdf): <cra.org/ccc/wp-content/uploads/sites/2/2016/04/AI-for-Social-Good-Workshop-Report.pdf>.

[1094] *The Canadian Copyright Licensing Agency v York University*, [2018] 2 FCR 43, 149 CPR (4th) 375. In rejecting York University fair dealing arguments, Justice Phelan of the Federal Court held that York requires to pay royalites.

Proponents of a broader fair dealing defence for machine learning or AI training argue that copyrighted data in such learning or training is used for research purposes and should, therefore, be exempt under fair dealing doctrine. Michael Geist recently expressed this:[1095]

> *"There are several purposes that would permit some text and data mining activities, notably exceptions for research, education, and private study. However, given Canada's emphasis on the commercial benefits of AI, the law may not offer sufficient flexibility to safely move from the lab or classroom to the market."*

Geist suggests that Canada should emulate US fair use, "by making the current list of fair dealing purposes illustrative rather than exhaustive", or by adopting specific data mining exception like in the UK.[1096] As I explain in the coming sections, however, broadening fair dealing is the wrong path for Canada.

Back in 2007, Israel's 2007 *Copyright Act* adopted a fair use doctrine similar to the US's.[1097] Zemer highlighted several core changes that this *Act* implemented, including: replacing fair dealing with fair use; broadening the list of exceptions and limitations; and adding new fair uses like quotations, instructions, and examinations (in a similar manner to the changes introduced in the *CDPA*).[1098] One significant difference between American and Israeli doctrines is that Israel

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However, it is interesting to note the negoatiations between the parties about the Interim Tariff described by the court. It seems that the parties could have reached a reasonable agreement to avoid the proceedings.

1095 Michael Geist, "Why Copyright Law Poses a Barrier to Canada's Artificial Intelligence Ambitions" (18 May 2017), online (blog): *Michael Geist Blog* <michaelgeist.ca/2017/05/copyright-law-poses-barrier-canadas-artificial-intelligence-ambitions>. See also Pascale Chapdelaine et al, *supra* note 1089 at 3-4 (suggesting to replace fair dealing with fair-use); Michael Geist, "Fairness Found: How Canada Quietly Shifted from Fair Dealing to Fair Use" in Michael Geist, ed, *From: The Copyright Pentalogy: How the Supreme Court of Canada Shook the Foundations of Canadian Copyright Law* (Ottawa: Ottawa University Press, 2013).

1096 *Ibid*, Michal Geist Blog.

1097 Israel, *Copyright Act, 2007*, s 19.

1098 Lior Zemer, "Copyright Departures: The Fall of the Last Imperial Copyright Dominion and the Case of Fair Use" (2011) 60 DePaul L Rev 1051 at 1078 [Zemer, Copyright Departures]; See also Tony Greenman, *Copyright Law*, 2nd ed (Green man publishing, 2008) at chapter 6 – permissible uses; Neil Netanel, "Israel Fair Use from an American Perspective" in Michael Birnhack & Guy Pessach, eds, *Authoring Rights: Reading in Copyright Law* (Nevo Publishers, 2009) at 377.

“does not refer to the commercial nature of the use and does not make an explicit distinction between commercial uses and nonprofit uses.”[1099]

Up until today, fair use or fair dealing relied on two core elements that excuse the usage of copyrighted data by computer programs:

1. The computer-program’s or machine’s inability to *purposely* infringe copyright;
2. The computer-programs’s or machine’s minimal or none- existent effect on potential markets in a way that is material to copyright law.[1100]

AI developments are beginning to challenge these assumptions. Machine learning is distinct from basic computer codes. Its algorithms do not require specific instructions and can learn and evolve by acquiring and analyzing data, adjusting its code in the process. This represents a marked departure from simple data gathering, storing, and processing employed by computer programs until now. These algorithms could potentially enable the study of a human author’s or artist’s expression and style and learn to employ patterns appropriating that author’s or artist’s distinct “tone”.

With that ability to mimic human expression and style, machine learning and AI pose a grave risk to human author’s market. Works resulting from an AI’s study of a particular human artist could provide affordable substitutes to their creations.[1101] Moreover, using copyrighted works as data renders that use of the work as “raw material” – as opposed to, for example, consuming the work or incorporating it into a new piece. Thus, *the way we use* the data should change *the way we define* the data. When a work is used for its designated purpose it should be

[1099] Zemer, Copyright Departures, *ibid* at 1084.
[1100] Sobel, *supra* note 1049 at 57.
[1101] *Ibid* at 75.

regarded as a work; when the work is used for a different purpose, like for AI training, it should be tagged in the same way the AI and its programmer view it: raw material or simply "data".[1102]

In the future, courts might make use of productive or consumptive dichotomy – developed by Justice Blackmun in the dissent to *Sony Corporation of America v Universal City Studios*[1103] – to determine if exempting AI data is just from a public policy perspective. The dichotomy's logic is straightforward: productive use benefits the public and might constitute a fair use, but consumptive uses are "not what the fair use doctrine was designed to protect."[1104]

Not all machine-learning or AI developments and applications should be recognized as productive by nature. As Justice Stevens warns us in *Sony*'s majority decision, we should be cautious not to fall into a legal "mash" arguing that *all* uses could result in productive social impact.[1105] Under the same logic, "[i]f future productivity is no defense for unauthorized human consumption, it should not excuse robotic consumption, either."[1106]

[1102] *Ibid* at 625: "I suggest that the language we use to describe how humans and AI systems experience copyrighted works reveals a new and different purpose. When humans experience these works, we call them 'works'. When AI systems do it, these works are transformed into 'data'." Matthew Sag called works using for AI developments "grist for the mill". Matthew Sag, "Copyright and Copy-Reliant Technology" (2009) 103 Nw UL Rev 1607 at 1624. See also Maurizio Borghi & Stavroula Karapapa, "Non-Display Uses of Copyrighted Works: Google Books and Beyond" (2011) 1 Queen Mary J Intel Prop 21 at 23.

[1103] *Sony Corp*, *supra* note 440.

[1104] *Ibid* at 496. Justice Blackmun explains, at 478-479, that a productive use is "resulting in some added benefit to the public beyond that produced by the first author's work."

[1105] *Ibid* at 455, footnote 40: "[T]he notion of social 'productivity' cannot be a complete answer to this analysis. A teacher who copies to prepare lecture notes is clearly productive. But so is a teacher who copies for the sake of broadening his personal understanding of his specialty. Or a legislator who copies for the sake of broadening her understanding of what her constituents are watching; or a constituent who copies a news program to help make a decision on how to vote."

[1106] Sobel, *supra* note 1049 at 74.

In many ways, fair use results from the ongoing struggles between authors and users.[1107] In her monumental 1982 paper,[1108] Wendy Gordon argued that fair use doctrine should be applied in three conditions:

1. When "market failure is present" (the pre-condition).[1109]
2. When "transfer of the use to defendant is socially desirable"; and,
3. When "an award of fair use would not cause substantial injury to the incentives of the plaintiff copyright owner."[1110]

Market failure theory offers a scale of legal arguments. Some scholars argue for a model in which all uses are paid in full: a fared use model.[1111] Others are concerned that a fared use model would "advance the interests of established rightsholders while inhibiting participatory semiosis and downstream uses of copyrighted works."[1112] Merges developed a further distributive model, arguing that copyright is a subsidy to creators, so fair use can be recognized as a tax on rights owners to facilitate specific usages.[1113]

3.2.3.3 Alternative Approaches to AI Data Barriers

Sobel argues that the two alternatives – machine-learning or AI's input as fair use or an infringement – are bad. The former would most likely stagnate technological developments and

[1107] *Ibid* at 84-5.
[1108] Wendy J Gordon, "Fair Use as Market Failure: A Structural and Economic Analysis of the Betamax Case and Its Predecessors" (1982) 82 Colum L Rev 1600.
[1109] *Ibid*. Market failures include: (a) high transactions costs and low anticipated profit (which, new technologies are likely to present); (b) uses that might harm externalities (scholarship for example); and (c) non-commercial activities and advancements of knowledge (free expression such as criticism).
[1110] *Ibid* at 1614.
[1111] Tom W Bell, "Fair Use vs. Fared Use: The Impact of Automated Rights Management on Copyright's Fair Use Doctrine" (1998) 76 NCL Rev 557 at 595.
[1112] Sobel, *supra* note 1049 at 84.
[1113] Robert P Merges, "The End of Friction? Property Rights and Contract in the 'Newtonian' World of On-line Commerce" (1997) 12 BTLJ 115. Merges argues that fair use should be extended behind Gordon's failed markets to subsidized categories of usages.

hinder research, leaving the field empty for other international players. The latter creates two different legal systems – for humans and non-humans – which would favour the non-humans and disincentivize the humans.[1114] Further, fair use might worsen inequality since only the strong and wealthy would be able to fight expensive legal suits.[1115]

Relying on fair use as a mechanism for regulating TDM and AI raises reasonable concerns.[1116] As illustrated above, the fair use doctrine does not provide certainty to users, investors, and AI companies, which is important for building a strong innovative market. On the other hand, fair use offers flexibility that is missing from the slow legislative process. Courts might more efficiently address new technological changes under old law than waiting for new law. There are also alternative means to address challenges, like levies and doctrinal or political reforms (such as Fisher's government-funded reward system for entertainment media to compensate creators).[1117] Different legal regimes, like contracts, could provide additional regulating measures.[1118]

My support lies with the narrow fair dealing camp, between it and broader fair use. Admittedly, fair use played a crucial role in welcoming a more inclusive copyright regime. Courts turned to this mechanism in cases where applying a rigid rightsholders policy would harm other important causes.

[1114] Sobel, *supra* note 1049 at 82: "Why should a digital humanities scholar devour millions of texts without compensating their authors, while a more conventional literary hermeneut-or an ordinary reader-must pay for the copyrighted works she interprets?"
[1115] *Ibid* at 85.
[1116] Grimmelmann, Copyright for Literate Robots, *supra* note 847 at 660, further addresses the concern that exempting machine creation might create two different legal system, which offer favorable treatment to machine creation.
[1117] *Ibid* at 90-6. Fisher, Promises to Keep, *supra* note 859.
[1118] Publishers, social media, and other giant services (Google, Microsoft, Amazon, *etc*.) are all using contracts to enforce their policy on its users.

Nevertheless, fair use must not exceed its original purposes. Retreating to fair use (or planting a US fair use model in fair dealing jurisdictions like Canada) to harbour TDM, machine-learning and AI training might restrain courts from addressing the real and significant issues: The relationship between artificial/machine and human creations. Instead, I suggest a different policy: An exemption for TDM, machine-learning and AI training. This exemption could feature a distinction between using data for commercial purposes and other public uses (including social justice causes). Royalties, for example, can be applied when data is used partly or wholly to develop algorithms for commercial purposes. Under this exemption, the government could provide access to data for social causes or other public benefits as part of its big-data policy.

There are reasons to be critical about royalties. Indeed, the EU's recent attempt to impose a quasi-royalty mechanism might chill exploring these ideas.[1119] But to establish an exemption mechanism for TDM, machine learning, and AI training, governments ought to explore all possible balanced approaches and weigh all relevant considerations.

Data barriers may also be alleviated by intermediate measures like levies, international agreements, and acquiring or licensing data. An example of an alleviating levy can be found in the US legislature's introduction in the 1990s of the *Audio Home Recording Act* (*AHARA*).[1120] A decent *ad-hoc* solution may be found by enacting AI-AHARA legislation to shield users and companies from infringing owners' works by using their data as input on the one hand and establishing a compensation scheme to provide royalties on the other.

[1119] Copyright in the Digital Single Market, *supra* note 1066 at art 13 (which was rejected recently).

[1120] Monica Zhang explains that *AHARA* "was intended to provide proper compensation to copyright owners by mandating royalties for certain technologies to compensate copyright owners for losses from home taping, while simultaneously shielding manufacturers and consumers from infringement liability." See Monica Zhang, "Fair Compensation in the Digital Age: Realigning the Audio Home Recording Act" (2016) 38 Hastings Comm & Ent LJ 145 at 147. See also David Nimmer, *Copyright Illuminated: Refocusing the Diffuse US Statute* (Kluwer Law International, 2008); Sobel, *supra* note 1049 at 91-3.

An example of an alleviating international treaty can be found in international initiatives like the recent *Marrakesh Treaty*.[1121] International treaties can include exceptions for specific technologies. And, since AI's and machine learning's advancement relies on access to data, exemptions for access to helpful but copyrighted sources might create desirable consequences for innovation and research.[1122]

An international initiative to create an open-source pool of free data and information could be a good start,[1123] though its chances of success are slim. First, reaching international consensus is difficult, made more so by issues like data protection and access laws that vary significantly between countries. Second, changes in the legality of the usage of information among different countries for other considerations (such as privacy) will only widen the gap between countries.[1124] Ultimately, an opportunity might arise to create a limited data pool for research or within bilateral agreements like NAFTA or USMCA.

As I explained earlier, acquiring or licensing data for development purposes might offer an alternative interim solution. Companies could acquire or license copyrighted data to build a database for machine-learning or AI training. These databases could include various types of data,

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[1121] *Marrakesh Treaty*, *supra* note 845. A unique international initiative that allows distribution of copyrighted data for the benefit of social causes. Lior Zemer & Aviv Gaon, "Copyright, disability and social inclusion: the Marrakesh Treaty and the role of non-signatories" (2015) 10 J Intell Prop L & Prac 836.

[1122] Tal Z Zarsky, "Incompatible: The GDPR in the Age of Big Data" (2017) 47 Seton Hall L Rev 995 at 996.

[1123] This suggestion also serves public policy considerations. By creating "data pool" for certain purposes, the government can make sure that the data is "clean" and unbiased. I understand that by delegating this role to the government – any government – censorship concerns might be justified. However, coping with big data in the age of "fake news" requires resources, funding and public driven interests. This task is most suited for government agencies. To alleviate legitimate concerns, the government can establish independent agencies and institutions, in order to limit political influence.

[1124] *GDPR*, *supra* note 184, is a good example. The *GDPR* is a comprehensive EU data protection legislation, regulating the processing of data originated in the EU. I share Zarsky's, *supra* note 1122, opinion that "[t]he GDPR's provisions are … *incompatible* with the data environment that the availability of Big Data generates. Such incompatibility is destined to render many of the GDPR's provisions quickly irrelevant. Alternatively, the GDPR's enactment could substantially alter the way Big Data analysis is conducted, transferring it to one that is suboptimal and inefficient. It will do so while stalling innovation in Europe and limiting utility to European citizens, while not necessarily providing such citizens with greater privacy protection."

which could also be found in the public domain or be provided by governments in support of AI research. However, a licensing policy is not ideal in the long term. First, the high costs of licensing are a significant barrier to small firms. Second, there might not be much variety of sources to satisfy AI developing needs. As Levendowski opines, "recent studies have suggested that, at least in the context of training AI systems, bigger is objectively better."[1125] On the other hand, encouraging individual data creation and licensing could open new markets and, either directly or indirectly, increase investments in high-quality data, which would benefit the AI field.

3.2.3.4 Orphan Works AI Challenges

3.2.3.4.1 The AI "Orphans"

An orphan work is a copyright-protected work in which the rights-holder cannot be located. Without an owner or author, the work is an "orphan". Orphan works pose different challenges to AI in the digital age:[1126]

1. More works are prone to manipulation. It is easier for a computer (nonetheless AI) to create works and circulate them through the Internet without anyone realizing that. Given expected developments in AI, a greater quantity of "orphans" is expected.[1127]
2. AI are becoming better and better in imitating human works, making it harder to distinguish between human and non-human creations. Thus, under the current legal regime, computer-

[1125] Levendowski, *supra* note 224 at 621: "AI systems trained using larger datasets perform more accurately than those trained with smaller ones."
[1126] There are other challenges posed by orphan works, which are outside the scope of my dissertation. For example, orphan works could cause a chilling effect by preventing users from creating derivative works. When copyright owners cannot be located, potential users do not have any way to seek permission to use the works. Their options are to either use it at their own peril and risk being sued in the future or forego using the work entirely, which can rob society of new works or access to reproductions of already existing works.
[1127] David R Hansen, "Orphan Works: Causes of the Problem" (2012) Berkeley Digital Library Copyright Project, Working Paper 3.

generated or AI works might be labelled as orphans despite having known (albeit inorganic) creators.

3. The process of composing a song or painting a picture often takes time and involve other people besides the (human) artist. AI, however, can generate instant works automatically without human's influence and involvement. Therefore, it is likely that more AI works would be "lost" given that the creation process makes it more difficult to track them.
4. Where a work is generated automatically with *no* human involvement, it could either be misappropriated by a human or simply labelled as an orphan if no human is involved and the origin is difficult to establish.

Notably, if the work is a computer's output with no human influence, it could also be considered not a work at all, since it lacks the human author required by many copyright regimes. Since an orphan work is copyright-protected, a computer-generated work would be better off as an orphan work (with no human) than a computer-generated work (with no human). On the other hand, AI technology has great potential in resolving some of the issues mentioned here. For example, smart AI search engines could enable better ways to locate rights-holders.

3.2.3.4.2 What are Orphan Works?

A work may be deemed an orphan for several reasons, not limited to the following:

- the author is deceased;
- the work was intentionally abandoned; or
- the work was generated automatically with little or no human involvement and without proper documentation (as with computer-generated works).

Different countries employ different licencing regimes for orphan works. In Canada, for example, an individual seeking to licence a song with no apparent author or owner can apply to Canada's Copyright Board, which evaluates the request and establishes whether the work needs a licence. If he demonstrates that he conducted a thorough search to locate the work's rights-holder and came up empty, the Copyright Board might concludes that no licence is required, "and the applicant will have the comfort of an official decision that its planned use is legal."[1128]

The Canadian orphan work definition hinges on whether the rights-holder can be located; the Board lacks jurisdiction where the rights-holder is unknown but locatable or was located but has not responded.[1129]

The UK, like Canada, uses an upstream model,[1130] by which users must apply for a licence if they want to use a copyrighted work. Users apply online, and the IPO collects and holds the fees for eight years; and, if a rights-holder emerges, the IPO transfers those funds to them. The IPO is more autonomous and therefore more flexible than similar administrative bodies in other countries.

The US and the EU have similar orphan work definitions. The US *Copyright Act* 1976 defines an orphan work as a work whose owner is impossible to identify or contact. The EU's definition is similar to the US's: a work whose author or rights-holder is not known or cannot be

[1128] Vaver, *supra* note 237 at 262; Giuseppina D'Agostino & Margaret Hagan, "IP Osgoode Orphan Works Hackathon: Final Report" (IP Osgoode, 2016), online: <canada.ca/en/canadian-heritage/services/copyright-policy-publications/orphan-works-hackathon.html>. Giuseppina D'Agostino, "Copyright Exceptions and Limitations and the Copyright Board of Canada" in *The Copyright Board of Canada: Bridging Law and Economics for Twenty Years (ALAI)* (Éditions Yvon Blais, 2011); Jeremy de Beer & Mario Bouchard, "Canada's Orphan Works' Regime: Unlocatable Owners and the Copyright Board" (2009), online (pdf): <cb-cda.gc.ca/about-apropos/2010-11-19-newstudy.pdf>.
[1129] The Federal Court of Appeals has stated that the Canadian Copyright Board is in a better position to adjudicate these matters and has deferred to its findings of facts as well as its interpretation and analysis. As stakeholders' interests drift farther apart, D'Agostino suggests that the Canadian Copyright Board will play an increasingly important role in balancing these interests.
[1130] UK *CDPA* (2013 amendment), section 116A (Power to provide for licensing of orphan works); J Griffiths, Lionel Bently & W R Cornish, "United Kingdom" in *International Copyright Law and Practice*, Paul Edward Geller & Melville B Nimmer, eds (Lexis Nexis, 2016) § 8[2][e][i]. The Comptroller-General of Patents, Designs & Trade Marks, can "grant non-exclusive licenses for the use of 'orphan works'."

located.[1131] The EU, like the US, employs a downstream model, which allows users to use copyrighted or copyrightable works without having to seek a licence, so long as they adhere to the regulatory requirements.[1132]

It has a two-pronged approach:

- The first prong: The *EU Directive 2012/28/EU*, which outlines the permitted uses of orphan works and includes a statutory exemption that allows "public service organizations" – like libraries – limited use of orphan works. The directive also includes a diligent search requirement, creates a registry, and mandates fair compensation if a rights-holder is found.
- The second prong: A Memorandum of Understanding which allows for the voluntary collective licensing of "out-of-commerce" works. The EU Intellectual Property Office regulates the EU scheme, and the Orphan Works Database was recently launched under its auspices.[1133]

1131 In 2012, the EU has also introduced orphan works legislation adopting the *Orphan Works Directive*, which was implemented in 2014. EU, *Commission Directive (EC) 2012/28/EU of 25 October 2012 on Certain Permitted Uses of Orphan Works*, [2012] OJ, L 299/5 at art 2: "[a] work or a phonogram shall be considered an orphan work if none of the rightholders in that work or phonogram is identified or, even if one or more of them is identified, none is located despite a diligent search for the rightholders having been carried out and recorded." Art 4 sets up a mutual recognition status of orphan works among the EU members states, while Art 6 forces EU member states to allow access to museums, archives, *etc*., to the works.

1132 As part of the EU Europeana initiative, the EU treatment is more comprehensive. Estelle Derclaye, Ben Smulders & Herman C Jehoram, "The European Union and Copyright" in *International Copyright Law and Practice*, Paul Edward Geller & Melville B Nimmer, eds (Lexis Nexis, 2016) § 4[2][i].

1133 The Orphan Works Database available online: <euipo.europa.eu/ohimportal/en/web/observatory/orphan-works-db>.

A licencing model exists in several other jurisdictions including: Nordic countries (which applies an extended collective licencing),[1134] Germany,[1135] Japan[1136] and Korea.[1137]

3.2.3.4.3 Orphans: Causes and Alternatives

According to the US *Orphan Works and Mass Digitization* report, there are four major causes for the growing ocean of orphan works:

1. the elimination of copyright formalities;
2. the progressive extension of copyright terms;[1138]
3. technological advancements which allow creators to "create and preserve more copyrightable works"; and
4. technological advancements – specifically the shift from print to mass digitation – which give users access to works and facilitate their use.[1139]

[1134] Most Nordic countries have adopted the ECL (extended collective licensing) model. ECLs allow for collective management organizations/collective societies, which represent right-holders of certain types of works, to license and collect royalties on behalf of right-holders (members and non-members alike). Most schemes have an opt-out mechanism. US Copyright Office, *Orphan Works and Mass Digitization: a Report of the Register of Copyrights* (2015) at 18-19, online (pdf): <copyright.gov/orphan/reports/orphan-works2015.pdf>.

[1135] Germany has an ECL framework for out-of-commerce works which libraries can use. There is a registry and the CMO can administer works by non-members so long as the works are listed in the registry, no right-holder has objected within six weeks, and the license is for a non-commercial purpose. *Ibid* at 27.

[1136] The government can issue licenses if there was a diligent, but fruitless, search. The user will still have to pay a fee, which goes into a fund. There is mandatory licensing for certain orphan works. This system has been used very rarely. *Ibid* at 31-32.

[1137] Users can apply for a compulsory license from the government and must indicate on the copies made that a license was granted for the use of that particular orphan work. This system, like the Japanese system, has also been used only rarely. *Ibid* at 32-33.

[1138] US, Register of Copyrights, *Report on Orphan Works* (Washington, DC: Library of Congress, 2006), online (pdf): <copyright.gov/orphan/orphan-report-full.pdf>. The report suggests that the increase of orphan works could be linked to the changes in US copyright law, which removes an owner's "formalities" requirements to obtain protection: "The elimination of two particular types of mandatory formalities, renewal and notice, play an important role in heightening the orphan works problem." See Hansen, *supra* note 1127 at 2-3.

[1139] Hansen, *ibid*.

The first two causes relate primarily to the US, but the last two can be applied more globally. Sherman and Bentley point out to another general cause: Authors do not even realize that they have created a copyrightable work.[1140]

The report notes the US orphan works system's shortcomings, including the lack of an incentive to conduct a diligent search and meagre protection for rights-holders of orphan works. The report rejects most foreign models (like Canada's) by claiming that despite creating a diligent search requirement, these systems are rarely used and are often limited in scope. Instead, the report suggests that users should still be allowed to rely on fair use, but that there should also be modifications made to the *Shawn Bentley Act* of 2008.[1141]

Given the changes in technology and mass digitation,[1142] the orphan works issue has become increasingly pressing. Legislators, courts, and academics are racing to keep up with the developments.[1143]

[1140] Bently & Sherman, *supra* note 406 at 330.

[1141] The modifications include: a notice of use provision, allowing judicial consideration of foreign determinations regarding the adequacy of searches, and an exception regarding the use of orphan works in derivative works. The report proposes that if users demonstrate good faith, do their due-diligence, give proper notice, and properly attribute the works or mark them with an orphan works symbol, they should be able to rely on the protection of fair use and be subject to only limited remedies. The report further suggests that the legislation include a definition of "due-diligence" and a list of best practices of searches. The report proposes that non-profit organizations that infringe copyright, should not be required to pay compensation so long as they cease their use immediately. There are several other suggestions, but the overarching theme is the need to balance the various competing interests, including the public interest.

[1142] Mass digitization is a related phenomenon which is exacerbated by the problem of orphan works. Mass digitization requires many licenses, which is difficult to obtain when there are so many orphan works. To address this issue, the Orphan Works and Mass Digitization report suggests creating an ECL framework (for educational purposes) where collective societies would collect royalties and would include an opt-out for rights-holder.

[1143] The IP Osgoode's Hackathon was a particularly fruitful source of technology-related proposals. These included an IP compliance tool for music streaming; an app which would allow users to mark a work as an orphan work (similar to the trademark symbol), which would allow them to demonstrate good faith and may also aid in locating rights-holders, a variety of navigation tools to make diligent searches easier; matchmaking tools to help locate rights-holders as well as companies providing license negotiation or diligent search services; and, a public-facing register. Participants in the Hackathon also offered policy considerations such as the collection of fees for system maintenance, the creation of an exception for library digitization projects, and the use of unpublished letters and archival material. They also suggested merging the orphan works scheme with the Canadian Intellectual Property Office and integrating Canadian and EU databases.

The orphan works problem has created a chilling effect which prevents potential users from using orphan works to create derivative works or reproductions of original works. Any solution devised to address this problem must balance the interests of authors, users, and the public: It must be transparent and provide certainty, but also be flexible enough to ensure fair outcomes.

As discussed above, international models diverge, employing upstream models (requiring users to seek a license) or downstream ones (no license is required, but users must comply with the regulations). Some jurisdictions contemplate *ex-post facto* compensation while others require *ex-ante* compensation. Each model has its benefits and drawbacks.[1144]

Tackling orphan issues requires a multi-tiered approach that includes policy changes, platform streamlining, better and more comprehensive databases, and more regulatory guidance. As D'Agostino and Hagan suggest, international government collaboration would increase access to resources and expand the knowledge base.[1145]

Any AI authorship model must address orphan works challenges. For example, AIs might be labelled as "the authors" of a work while the public would own its economic rights. In this scenario, AI orphan works could be exempted.

Alternatively, maybe there should be no *digital* orphan works, and orphan works legislation should be amended to include only human works. Orphan works should also be exempted for AI training and TDM. Given the importance of quality data to AI development, orphan works might act as a better alternative to more expensive and less accessible data. In balancing between orphan

[1144] Common critiques are the limited scope of the legislation or the power of the regulatory body, the long processing times, the lack of transparency and certainty, systems which are difficult to navigate, the lack of regulatory guidance, the problematic engagement of collective societies and the burden placed on them, the lack of incentives for users to engage with the system and follow the regulations, and the limited resources available.
[1145] D'Agostino & Hagan, *supra* note 1128.

works rights-holders, the public, and the specific use of the works, the balance shifts towards creating an exception for orphan works AI databases.

3.3 WHO IS THE AUTHOR?

My discussion focuses on authorship of a computer-generated or AI work, specifically on who should be the rightsholder of an AI's output. Many entities are involved in the development of an AI and its subsequent creations,[1146] so the question engages different players, each one of whom could be a legitimate rights-holder. Some players are at odds with each other (AI/public/programmer), others might be willing to share their rights (programmer/user), and still others may overlap (programmer/employee).

First, the relationship between ownership and authorship is a preliminary and crucial consideration for answering the question in a "just" manner. Many copyright law frameworks – Canada's, for example – make ownership dependent on authorship by granting the author copyright as the first owner.[1147]

The concept of authorship was influenced by concepts of ownership (and property) and vice versa. Thus, "to ask who is the author of a computer-generated work is to ask who has ownership rights in it."[1148] From a doctrinal perspective, however, authorship and ownership can be kept apart as two distinct concepts. The presence of one does not necessarily make the other present too. Regardless, authorship and ownership affect each other significantly, making a separation process very difficult.

Second, is a lack of consensus among IP scholars that AI *could* be an author or *should* be treated differently from "pen-and-paper works".[1149] Grimmelmann, for example, argues that there

[1146] Yanisky-Ravid and Liu outline ten entities: programmers, data suppliers, trainers and feedback suppliers, AI systems owners, AI operators [*i.e.*, the users], new employers, the public, the government, investors and the AI system itself. Yanisky-Ravid & Liu, *supra* note 293 at 2231-2233; See also Boyden, *supra* note 714 at 378.
[1147] *Copyright Act*, RSC 1985, *supra* note 590, s 13(1).
[1148] Samuelson, *supra* note 423 at 1189-1190.
[1149] James Grimmelmann, "There's No Such Thing as a Computer-Authored Work – And it's a Good Thing, Too" (2016) 39 Colum J L & Arts 404 at 406 Grimmelmann states that "[e]very kind of copyrighted work can be – and

is nothing new under the sun, and "[w]e can imagine a digital creative process that perfectly parallels any analog one."[1150] Grimmelmann claims that these considerations, "have been with us since the Statue of Anne" and will remain with us "as long as copyright considers it important to assign ownership of a work to an 'author' who is causally responsible for the work's existence."[1151]

Ginsburg & Budiardjo have stated further that "computers today, and for proximate tomorrows … would not qualify as 'authors'. Asking whether a computer can be an author therefore is not a fruitful inquiry."[1152] Other scholars contend that IP law might not be relevant in the future for both human and non-human alike. As I already explained, I do not share these assumptions.

In this section, I will present the directions that AI authorship might take in the future. First, I will address the main players who have a substantial claim to AI's authorship: the programmer, the user, and the AI. Second, I will address the "no authorship" alternatives; these can be framed in different ways, such as public rights or government ownership. Finally, I will address two other rights models: author in law, and AI moral rights.

My analysis centres around the traditional copyright framework; but I will make further policy observations and consider alternative legal frameworks where applicable. I am willing to establish that the computer or AI is the author of its own independent computer-generated work (*i.e.*, where no human involvement occurred). In past and current stages of computer-assisted

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regularly is – created using computers." Microsoft Word, Apple Pages *etc*. for literary works; Sibelius, Noteflight for musical works; Adobe Photoshop for pictures and graphics and so on.

[1150] Grimmelmann, There's No Such Thing as a Computer-Authored Work, *supra* note 1149 at 407.

[1151] *Ibid* at 404. Ginsburg & Budiardjo, *supra* note 714 at 6, echo Grimmelmann in a recent paper, stating that "the questions artificial intelligence (AI) raises precede the digital era. They arose with the advent of photography, and persist whenever a work's creator incorporates uncontrolled forces, whether faunal or meteorological, mechanical or digital, to generate the work." Therefore, they conclude, at 53, that "generative machines should be examined through the lens of copyright's previous treatment of tools and amanuenses […]."

[1152] Ginsburg & Budiardjo, *ibid* at 6-7.

works – when the program operates merely as a tool – the programmer, user, or owner of the program should be considered as an author (reserving all subsequent rights, economic or moral, when applicable).

In the next stage of development – generated by computer alone – the complexities snowball. The courts will most likely prefer to establish human impact on the creation (even minor) to avoid allocating legal rights to AIs. This approach might suffice, but only for a while. As technology advances, sustaining this legal framework would be difficult, and thus we should consider other alternatives.[1153]

A collaborative legal framework might be prudent in this next stage, one that involves joint authorship or ownership between one or more of the key players and the AI. Under this model, either rights would be assigned to the public – making the work available for use for a short period – or profits would be invested in government foundations for public causes. The only restriction on this model would be an obligation to attribute the creation to the AI or computer that created the work. As several scholars suggest, attributing computer-AI rights is essential to avoid potential exploitation, manipulation, and degradation of those works. It is also vital to promoting the integrity of knowledge.

In the final stage, if and when we reach singularity, it is hard to predict what might happen and what authorship model may fit. I suggest, however, that we do not discriminate between human and non-human creations at that stage. I advocate for AI rights or at least a limited set of moral rights that recognize an AI's attachment to its creations.

[1153] In discussing alternative models for computer-generated or AI authorship, I am willing to consider other ideas, such as assigning the programmer the neighbouring rights in the works for a limited time.

3.3.1 The Programmer

The first and most favourable candidate for AI authorship is the programmer.[1154] We should distinguish between two different models for the programmer:

1. the "basic" – authorship in the AI's program itself; and
2. the "basic plus" – authorship in both the AI's program and the AI's output.

As CONTU explains, "[a]uthorship of the program or of the input data is entirely separate from authorship of the final work, just as authorship of a translation of a book is distinct from authorship of the original work."[1155] Unfortunately, looking to CONTU's recommendations for guidance might not prove very useful.[1156]

At the present stage of AI development, programmers might have more substantial claims for authorship in the computer-generated or AI output because a line can be clearly drawn between programming and the program's output. As AI develops, however, that line weakens along with an authorship claim.

When a programmer creates an AI capable – by its definition and basic code – of changing its own algorithm, its creation process, and the creation itself, the line might disappear entirely. As Wu observes, "The programmer does not cause the output to be fixed in a tangible medium, because of the user's intervention, or the randomness built into the program."[1157]

[1154] There could be more than one programmer or, for that purpose, a company that employs a group of programmers.
[1155] CONTU, *supra* note 621 at 45.
[1156] Samuelson, *supra* note 423 at 1195, footnote 34: "CONTU did not explain why it thought the failure to get permission to use a copyrighted program or data base (something the copyright owner normally has no statutory authority to control) would "limit or negate" the user's copyright in the output." CONTU, *ibid* at 45-6: "It is, of course, incumbent on the creator of the final work to obtain appropriate permission from any other person who is the proprietor of a program or data base used in the creation of the ultimate work. The unlawful use of a program or data base might limit or negate the author's claim of copyright in the ultimate work, just as the failure of a translator to obtain a license from the proprietor of the translated work might prevent securing copyright in and making use of the translation."
[1157] Wu, *supra* note 14 at 171.

The programmer of such a program might have authorship (and patent) rights to the AI program, but his claim to the output diminishes. Vaver would agree, "Where the programmer has no control or creative choice over what the translation program is applied to, and the source work owner has no control or creative choice over the workings of the program, neither deserves to be called an author […]."[1158]

Ginsburg and Budiardjo imply that surrendering too much control over the execution of a work calls into question whether the "initial conception of the work was anything more than a general idea."[1159] In *Kelley v Chicago Park*, the Seventh Circuit, seem to accept the notion that when an author (or a programmer) has limited control on the outcome, assigning copyright protection might be challenging.[1160] However, they do seem to agree that the programmer "of fully generative machines … which create works without further intervention or input [*i.e.*, randomly] can be the author of the resulting outputs."[1161]

Lack of connection between the programmer and the resulting output of the computer-generated or AI program "does not destroy the designers' authorship claims any more than the lack of a direct connection between the nature photographers' minds and the expressive aesthetic

[1158] Vaver, Translation and Copyright, *supra* note 718 at 162. Vaver explains the *CDPA* position stating that "[t]he reason for protection has nothing to do with encouraging human creativity and everything to do with protecting the product of capital investment from unfair competition or misappropriation."
[1159] Ginsburg & Budiardjo, *supra* note 714 at 20. They further explain, at 33: "[I]f an artist fully develops a creative plan or conception for a work … but does not control the execution of that plan (instead delegating the execution to a force beyond the author's control), the artist may not be an 'author' in the copyright law sense." The same is true to programmers.
[1160] 635 F (3d) 290 (7th Cir 2011). In Kelly, the court discussed whether a living garden could be considered a work under copyright law. In rejecting copyright claims, the court held that forces of nature cannot be copyrighted. This decision is controversial and was criticized by several scholars. See e.g. Jani McCutcheon, "Natural Causes: When Author Meets Nature in Copyright Law and Art. Some Observations Inspired by *Kelley v Chicago Park District*" (2018) 86 U Cin L Rev 707.
[1161] Ginsburg & Budiardjo, *supra* note 714 at 71: "[C]opyright law does not always require an author to hold in her mind a precise mental image of the work she sets out to create. The essence of the conception requirement is the formulation of a complete creative plan for the work."

content of their works destroys those photographers' ability to claim authorship over their images."[1162]

Several justifications exist to adopt a programmer-based authorship model. First, the programmer is responsible for the AI program's creation by providing creativity, skill, and labour to the program,[1163] and crucially influences the creation process. Using the labour-based justifications, "even though it may be a fruit he had not envisioned" the programmer is normatively entitled to his or her reward for the fruits of his or her labour in making the program.[1164] According to this perspective, the AI program and all subsequent products are the results of the programmer's labour. From a utilitarian perspective, the programmer must be incentivized to create the program; without awarding copyright, there would be no incentive for creating or improving AI programs.[1165] Tying this together, the programmer authorship model requires no significant changes to the existing authorship legal framework. Several jurisdictions have already adopted a programmer-based model, including the UK.[1166]

By default, allocating authorship to the programmer is both normatively and doctrinally justified. Advocating a programmer authorship model as a default, however, should not mean that the programmer be designated as owner in all cases and circumstances. It equally should not extend copyright to the maximum length of fifty or seventy years. So, while the current legal framework grants programmers' copyright in both the program and its output,[1167] I argue for a new model that

[1162] *Ibid*.
[1163] Bridy, *supra* note 423 at 51, further offers that "[i]ntuition and the principle of transitivity both suggest that the programmer of generative software is the logical owner of the copyright in the works generated by his or her software. He or she is, after all, the author of the author of the works."
[1164] Samuelson, *supra* note 423 at 1205.
[1165] Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 706-707: "Developing AI systems capable of creating works of authorship is a great accomplishment. Therefore, it may make sense to grant programmers the copyrights of works created by AI systems to recognize the magnitude of that accomplishment."
[1166] *CDPA*, s 9(3), which indicate that the author of a computer-generated work "shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken."
[1167] See e.g. *Software Directive*, *supra* note 641.

would limit copyright for both the program and its output. We should, however, distinguish between copyright protection for the program and the output of the program. It might be normatively justified to offer a more extended protection period for the former.[1168]

In earlier chapters, I presented models by Parchomovsky, Siegelman, and Stein, who advocate for a more balanced approach to IP and copyright protection that correlates the level of protection awarded to the level of originality of the creation.[1169] These innovative approaches might offer a good alternative for establishing the level of protection for the programmer.

Further, given the differences between AI programs (advanced AI programs and more basic programs), there are normative justifications for limiting the scope of protection to the programmer even where copyright protection is a desirable outcome.[1170] AI programs have a shorter lifespan than other programs. Extending copyright protection for a long period would hinder the ability to develop additional applications or make changes to the program, which is a socially desirable outcome. A limited balanced copyright model for AI programs would incentivize more AI research.

From a policy perspective, assigning copyright in the AI's output to the programmer overstretches the authorship concept to any creator of intellectual labour. Given the length of copyright protection, broadening the scope of authorship might adversely shift the balance in other IP regimes. Take patenting, for example, where strengthening programmers would strengthen large companies and developers like Google and Microsoft at the expense of the public and other small players.

[1168] Considering, for example, the time and investment of the programmer in making the program.
[1169] Parchomovsky & Siegelman, *supra* note 426 at 1458; Parchomovsky & Stein, *supra* note 427 at 1507.
[1170] These considerations extend the scope of my research. We should not extend the maximum length of copyright protection for the programs (50 to 70 years). In my opinion, even patent models of 15-20 years is too much.

Samuelson provides further counter-arguments against a programmer-based model. For starter, "[i]f the programmer chooses to exploit the value of the program by charging a significant fee for its acquisition, it seems only fair that he agrees to yield some of his rights to those who have paid for that right."[1171] Samuelson also explains why expectations between the parties – the user and the programmer – justify that the programmer would not be able to claim copyright in the computer-generated/AI creations: [1172]

> *"Granting all rights to the programmer would mean that the programmer would automatically own everything the program was capable of generating. This solution over-rewards the programmer, particularly in light of the fact that the programmer is no more able to anticipate the output than anyone else."*

Even in the limited cases that discuss computer-generated or AI copyright "courts have consistently taken the pragmatic approach of attributing authorship for copyright purposes to the person who held the pen and did the actual writing."[1173]

While there are good justifications for assigning programmers copyright in the program itself,[1174] there are reasons not to assign copyright in the AI's output: "Just as we do not need to incentivize programmers to create works of authorship in which they do not have any creative input, we do not need to recognize a programmer for an artistic accomplishment that is not his or her own."[1175] Dorotheou agrees that when "the connection between the programmer's work […]

[1171] Samuelson, *supra* note 423 at 1207. This argument, however, is challenging in cases in which the programmer charges no fee like in open source programs. Freeware, creative commons, or ad-revenue based software models skirt this argument.
[1172] *Ibid* at 1208.
[1173] Bridy, *supra* note 423 at 50.
[1174] An interesting case is *Nova v Mazooma*, in which Kitchin L. J. debated whether authorship in a computer-generated work subsides with the programmer or the user, ruling for the programmer, which was responsible for designing the games. *Nova Productions [2006]*, *supra* note 746.
[1175] Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 707. See also Yanisky-Ravid & Liu, *supra* note 293 at 2236: "[W]e do not challenge the eligibility of the programmer to be entitled to ownership according to copyright

and the final work is too remote […] [t]here can no longer be a link to the programmer, irrespective of whether the programmer was the original creator."[1176]

Arguments in favour of assigning copyright in the AI's works to the programmer posit the view that this is the most prudent and doctrinally reasonable policy. Even if we follow the suggested logic that AI program and the AI's output should be assigned to the programmer, we might be creating an even bigger problem concerning the enforceability of the rights over the AI's output.[1177]

In between the "no copyright" and "all copyright" to the programmer's, a middle ground approach might help to resolve the issue. Similar to patents and Parchomovsky's model, the programmer could be granted a neighbouring right in the AI's output for a limited time.[1178] The Canadian *Copyright Act* contains several neighbouring rights. Between the songwriter and the maker of the recording, the latter retains neighbouring rights solely in the recording, while the songwriter retains authorship rights in the composed music.

Translating this model to AI, the songwriter becomes the programmer – the musical composition assimilated to the AI program – and is thus entitled to copyright for that program. Neighbouring rights in the AI's output then falls to the programmer, the user, or the AI depending on the circumstances of the output's generation.

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laws governing the software she or he develops … On the other hand, this entitlement does not automatically result in ownership over the products and processes created by AI systems."

1176 Dorotheou, *supra* note 423 at 90.

1177 Wu addressed these concerns back in 1997 arguing that "[a] major practical problem with awarding copyright ownership to the programmer is enforceability. Is the user expected to notify the programmer and voluntary pay royalties every time the user uses the program to generate another work? More likely, the user will have an incentive to conceal the output, and the programmer will have a choice of licensing the software into a shroud of distrust and suspicion or avoid licensing the software altogether." However, as Wu pointed out, this situation is no different from enforcing any licensing agreement. Wu, *supra* note 14 at 171.

1178 Part II to the *Copyright Act*, RSC 1985, *supra* note 590, outlines the legal framework for protecting neighbouring rights (for example performance and sound recording).

In reflecting between the different models I have presented above, and will discuss below, under our present level of computer-generated or AI development programmers and users – are better candidates for AI's neighbouring rights. As for those neighbouring right's protection terms, the EU database protection of fifteen years might serve as a benchmark.[1179] I would suggest a limited term of no more than five years because that length is more appealing to current legal and technological levels and thus could be applied without posing significant difficulties.[1180]

3.3.2 The User

Deciding authorship between AI, users and programmers reminds me of the famous Bible story, the *Judgment of Solomon*:[1181] Two women claim to be a baby's mother and, to resolve the dispute, King Solomon suggests cutting the baby in half to give one half to each mother (only the true mother, of course, refuses the offer by demanding that her beloved child remain intact). Here, instead of a baby, users and programmers both have claims to a computer-generated or AI "baby".[1182]

As with the Bible story, determining ownership (parenthood) is difficult, because "[t]he resulting work might be virtually identical to the program, or it might be virtually identical to the user's input, or it might be similar to both, but identical to neither, and we will have to inspect the expression in the program, the input, and the work to say for sure which is the case."[1183]

1179 EU, *Commission Directive (EC) 96/9/EC of 11 March 1996 on the Legal Protection of Databases*, [1996] OJ, L 77/20 at art 10(1) [*Database Directive*].

1180 Five years might seem arbitrary. In a way it is. There are reasons to limit protection to software. As I explained in Part II, programs have a very limited lifespan. The lifespan of a smartphone's application, for example, is only a few weeks. We can expect that with advancements in technology AI and machine-learning programs' lifespan would be even shorter. Under this assumption, offering the programmer longer protection is not justified and less reasonable to sustain under the utilitarian approach (which is the strongest basis for assigning copyright protection to the programmer).

1181 1 Kings 3:16–28.

1182 Some authors, however, compare a song to a baby – Yehonatan Geffen, a famous Israeli composer, for example, wrote in *The Sixteen Sheep* album – "How a song is born? Like a newborn baby."

1183 Grimmelmann, There's No Such Thing as a Computer-Authored Work, *supra* note 1149 at 411.

Bruce Boyden suggests seeing authorship as a spectrum where, as "the programmer contribution increases, the user's decreases and vice versa."[1184] Accordingly he says that,[1185]

> *"[D]etermining the authorship of a work will depend on whose meaning or message is embodied in that work … whether a computer-generated work transmits a person's meaning or message correlates with whether they would be able to predict the output of the computer program in operation."*

In our current stage of AI development, computer-generated output derived from simple software – akin to a Microsoft *Word* document or Adobe Photoshop image – falls into the user-heavy extreme of the spectrum. Once the program is released, the resulting documents or images are exclusively created by users, not the programmers.[1186]

At the other programmer-heavy extreme, we might find a CD played by a software program, or a "Choose Your Own Adventure" story in which the user can choose a path from an infinite number of options.[1187] Boyden concludes that "at least at the extremes what determines authorship of the output of a computer is whether a person's intended meaning reliably or predictably forms part of that output."[1188]

[1184] Boyden, *supra* note 714 at 387.

[1185] *Ibid* at 385.

[1186] Unless the programmer happens to be a user, and in such a case the programmer would simply be classified as a user.

[1187] Ginsburg & Budiardjo, *supra* note 714 at 35, further explain: "We might conclude that the reader [*i.e.*, the user] is not the author of the sequence because he has contributed nothing that the initial author [*i.e.*, the programmer] has not foreseen; the author has preset the content of each option, and the combinations of options, though numerous, remain a very finite universe." In other words, even if the user is in fact the creator of the output, given that its creation was limited to the programmer's conceptions and ideas, and could not exceed the programmer's plan, the user could not be labled as the "author" of the output. The courts reached a similar outcome in videogames cases. In *Midway Mfg Co v Artic Int'l Inc*, 704 F (2d) 1009 at 1012 (7th Cir 1983) the court held: "Playing a video game is more like changing channels on a television than it is like writing a novel or painting a picture. The player of a video game does not have control over the sequence of images that appears on the video game screen. He cannot create any sequence he wants out of the images stored on the game's circuit boards. The most he can do is choose one of the limited number of sequences the game allows him to choose. He is unlike a writer or a painter because the video game in effect writes the sentences and paints the painting for him; he merely chooses one of the sentences stored in its memory, one of the paintings stored in its collection."

[1188] Boyden, *supra* note 714 at 387.

Ginsburg & Budiardjo provide a somewhat similar view on the matter. Instead of a spectrum, they suggest a binary model between upstream and downstream creators. The upstream creator will be the sole author if he or she controls "the downstream contributor's process of execution," reducing the latter to a "[…] 'mere amanuensis', or to selecting among outcomes the upstream contributor has anticipated and build into the work." The downstream creator would be the sole author if the upstream creator "provided only an unprotected idea, which the downstream creator has elaborated into detailed conception."[1189] The upstream might be considered "the programmer" and the downstream "the user".

There are several good arguments that favour granting users AI authorship. In computer-assisted works (*e.g.*, Microsoft *Word*), the case for a user's authorship is self-explanatory: The program operates as a pen,[1190] and the user – not the programmer – authors the work. As Grimmelmann suggests, "[W]here the program is Finale [musical composition software] and the work is a string quartet, the user is the author of that musical work."[1191] As long as the user employs his or her skill, labour and creativity in creating the work, it is logical that authorship should be assigned to the user,[1192] who – as Samuelson adds – should then "be free to exploit this product commercially."[1193]

Conversely, the user's claim to authorship weakens when his role becomes insignificant or trivial and his input in the creative process diminishes. An example would be cases where the user

[1189] Ginsburg & Budiardjo, *supra* note 714 at 34.
[1190] As Justice Whitford expressed in *Express Newspapers*, *supra* note 728 at 1093.
[1191] Grimmelmann, There's No Such Thing as a Computer-Authored Work, *supra* note 1149 at 409-410. Grimmelmann further explains that there is no real issue with the fact that in some cases the only difference between users who are authors and users who are not is a push of a button: "The user who pushes a button on a music box to start it playing is not an author; the user who pushes a button on a camera to take photograph is."
[1192] Obviously, as the role of the user diminishes, and other contenders appear, the user's claim for authorship is weakened.
[1193] Samuelson, *supra* note 423 at 1192. The only exception, Samuelson explains, "should be for instances in which the work generated by a computer incorporates a substantial block of recognizable expression from the copyrighted program."

only initiates the program that then performs its own self-sufficient AI program or pre-conditioned codes.[1194] Indeed, "where the program displays a fifteen-second animation of fireworks whenever the user pushes the space bar, the programmer is the author of that audiovisual work." Jane Ginsburg echoes Grimmelmann, stating that while "Pope Julius II may have commissioned the painting of the ceiling of the Sistine Chapel … the author of the frescos remains Michelangelo."[1195]

As technology and AI progresses, a user's claim (or AI) for authorship in the output might wane where the programmer's claim grows. This will occur particularly where the program expresses more independence, clearly increasing the programmer's influence on the outcome. Guadamuz aims to solve this ambiguity by simply "reading the letter of the law and applying it on a case by case basis.[1196] If the artificial agent is directly started by the programmer, and it creates a work of art, then the programmer is clearly the author … However, if a user acquires a program capable of producing computer-generated works, and uses it to generate a new work, then ownership would go to the user."[1197]

Guadamuz's distinction seems reasonable. A user's influence on the creative process might justify allocating copyright to him and not to the programmer or the AI. Ginsburg and Budiardjo explain that "[t]he user's creative contribution interrupts the designer's authorship claim."[1198] Thus, a "potential distinction is whether the user supplies anything *new* to the machine, or whether the

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[1194] *Ibid* at 1201: "It is difficult to justify user authorship when the role of the user of a generator program has been reduced to merely causing the output to be generated (for example, typing the word 'compose' in a music generator program)."
[1195] Ginsburg, People Not Machines, *supra* note 795 at 134. Ginsburg adds: "Were a future Julius IV to instruct a computer to interrogate its comprehensive database of religious art to devise and paint a sequence of Old Testament scenes, that Julius would no more be the author of the output than was his forebear."
[1196] In *Toronto Real Estate Board v Commissioner of Competition*, 2017 FCA 236 (CanLII), online: <http://canlii.ca/t/hp34l>, the Federal Court of Appeal of Ontario, reached a similar conclusion, stating, para 185: "The point of demarcation between a work of sufficient skill and judgment to warrant a finding of originality and something less than that – a mere mechanical exercise – is not always self-evident. This is particularly so in the case of compilations. It is, however, within the parameters of the legal test, a highly contextual and factual determination."
[1197] Guadamuz, *supra* note 422 at 176.
[1198] Ginsburg & Budiardjo, *supra* note 714 at 83.

output is necessarily a rearrangement of elements already within the machine."[1199] Samuelson agrees, "Whatever the user does to the text thereafter to edit or change it will, of course, create the basis for saying that the user may be an author of those portions of the text that he modified." She argues that users cannot be authors of or claim IP rights to unmodified portions, or "perfect" raw output.[1200]

Ginsburg and Budiardjo offer a different distinction – the possible anticipation test. When the programmers "define and bound the downstream creator's role" (*i.e.*, the user), the user "does not disrupt the upstream creator's claim of authorship", and thus the programmers would be designated as authors.[1201] However, "when the upstream creator's creative plan for the work does not limit the downstream user's creative autonomy, and instead relies on the downstream creator to endow the work with additional (and unforeseeable) creative content, the upstream creator cannot claim to be the sole author of the resulting work."[1202] In determining ownership, the Ginsburg and Budiardjo model apply torts foreseeability reasoning, asking "whether the upstream creator could have anticipated what the downstream user would do to 'complete' the work."[1203]

An argument against user-authorship model is the "free rider" principle. Assigning copyright to users – especially those with minimal contributions to the creation process – disincentivizes programmers and other players from investing in technology (as discussed later, this argument also applies when assigning copyright to the AI or to the public).[1204] In response to

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[1199] *Ibid* at 86.
[1200] Samuelson, *supra* note 423 at 1201: "Under the traditional paradigm of copyright, the answer to these questions would seem to be 'no'."
[1201] Ginsburg & Budiardjo, *supra* note 714 at 88. In this scenario, "the upstream creator has effected a limited delegation of creative control to the downstream creator, who simply completes the upstream creator's creative plan by making a relatively foreseeable choice – pushing a button, choosing between a limited set of parameters or settings, or moving a joystick to proceed through a simple videogame."
[1202] *Ibid* at 88-9.
[1203] *Ibid* at 89. Ginsburg & Budiardjo explain that the test "would not inquire whether the machine's designer actually anticipated the result."
[1204] Dorotheou, *supra* note 423 at 91; See also Perry & Margoni, *supra* note 779.

this argument, Wu endorses a basic contractual arrangement to balance the claims of programmers and users, "A programmer could always make the program more attractive to users by specifying in the software license that the user has certain rights to works generated by the program."[1205] If the parties behave rationally, we can assume that the market would drive the program's price and reflect an arrangement that maintains incentives to create and improve the program, while providing a worthwhile enough user experience that users continue purchasing or entering a licensing agreement for that program.

Other arguments against user-authorship include Hristov's position that since users "have the smallest contribution to the initial development of AI, their claim for authorship is the least compelling",[1206] so "[b]y losing copyright claims to end users, owners and programmers may restrict the use of AI by third parties."[1207]

Despite this, there are still good statutory reasons to allocate authorship to users. One is that "the user will have been the instrument of fixation", which copyright law traditionally grants as the author. US courts share a narrower view on fixation,[1208] rejecting user-authorship arguments in *Stern Electronics* and *William Electronics* that the user – not the programmer – fixed the work and is entitled to authorship.[1209] Nichols argues, however, that the factual basis that led the US courts to that conclusion is quickly disintegrating, "The vastly enhanced complexity of today's

[1205] Wu, *supra* note 14 at 162-163.
[1206] Hristov, *supra* note 422 at 444.
[1207] *Ibid*.
[1208] *Stern Electronics*, *Supra* note 634; *Williams Electronics*, *supra* note 632.
[1209] Wu, *supra* note 14 at 151: "The Second Circuit rejected the argument because 'many aspects of the display remain constant … regardless of how the player operates the controls' and this 'repetitive sequence of a substantial portion of the sights and sounds of the game' qualifies for copyright protection."

games makes the fixation inquiry for the purposes of a game publisher's claim to an audiovisual work much more difficult."[1210]

Samuelson provides this policy consideration as a counter to the disincentivization argument: The program's programmer or owner was already compensated for the right to use the program, either by the user's purchase or license.[1211]

Moreover, users "are in the best position to take the initial steps that will bring a work into the marketplace."[1212] Thus, the user authorship model serves society's interests better. As Samuelson noted before *Feist*,[1213] many jurisdictions' low originality standards support user authorship.[1214] Under the US's current originality standard, it would be more difficult to justify originality for mere button-pushing, but in the UK and other jurisdictions, user-authorship through low-originality standards has a stronger foothold.[1215]

Looking for guidance in the case law toward user-authorship provides little help, as jurisprudence on it is scant. In the UK, Kitchin L. J. acknowledged the user's impact on the creation process, stating in *Nova Productions v Mazooma Games* that "[t]he appearance of any particular

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[1210] W Joss Nicholas, "Painting through Pixels: The Case for a Copyright in Videogame Play" (2007) 30 Colum J L & Arts 101 at 115. Nicholas further suggests, *ibid* at 116: "Today, videogame play lies on a spectrum of interaction ranging between 'changing channels on a television' and 'writing a novel'. As it approaches the latter, a game producer's claim to the game itself as an audiovisual work diminishes. Instead, the focus turns to the videogame play: who creates it and who, if anyone, owns it? Thus, we are back to the issue first discussed in the introduction of this Article: what are the copyright implications when third parties complete the novel?" I would add that Nicholas' paper dated more than a decade ago and, if anything, his conclusion is more relevant today.

[1211] Samuelson, *supra* note 423 at 1203. Samuelson offers further policy considerations. For example, the ability of the user to play a greater role "in shaping the output into a commercially valuable form", and that the user "may use the program for functions that are beyond the programmer's expertise" (utilize a program for developing some architectural plans can only be done by an experienced architect user).

[1212] *Ibid* at 1227.

[1213] *Feist*, *supra* note 440.

[1214] Samuelson, *supra* note 423 at 1202: "One who tape-records a live performance of improvised jazz, for example, is considered the 'author' of the sound recording thereby under copyright law, even though the creative input by the user of the recorder might be limited to pressing the 'record' button."

[1215] I will address AI copyright standard in the following chapters.

screen depends to some extent on the way the game is being played."[1216] Even if the user has some impact, however, Kitchin L. J. ruled against any authorship claim since the user's "input is not artistic in nature and he has contributed no skill or labour of an artistic kind. Nor has he undertaken any of the arrangements necessary for the creation of the frame images. All he has done is to play the game."[1217]

On the first reading of *Nova*, it seems that Kitchin L. J.'s view on the user's artistic contribution to the computer-generated or AI sets the bar high for a user's authorship. This high bar makes programmers – at least in the UK – natural candidates for authorship in both the program and its output. On a second reading, however, I suggest that *Nova*'s ruling offers guidance to a user's authorship in computer-generated or AI works, depending on the user's influence on the creative process. In *Nova*, the user's impact was limited to following the original design dictated by the programmer and can be distinguished from cases where the user has more liberty in the creation process and effectively changes the outset of the program's output.

In *Torah Soft Ltd v Drosnin*,[1218] and *Rearden, LLC v Walt Disney*,[1219] the US courts established "whether the user's contribution constituted the 'lion's share of the creativity' and thus superseded the authorship claim of the designer of the program."[1220] And, although in *Walt Disney* the court relied on the *Torah Soft* decision, it reached a different outcome, concluding that "unlike in *Torah Soft*, where the user merely inputs a word into the program, MOVA Contour's user inputs

[1216] Guadamuz, *supra* note 422 at 177; *Nova Productions* [2006], *supra* note 746. See also *Navitaire v EasyJet*, [2004] EWHC 1725 (Ch).
[1217] *Nova Productions* [2006], *ibid* at para 106.
[1218] 136 F Supp (2d) 276 (SDNY 2001).
[1219] 293 F Supp (3d) 963 (Dist Ct Cal 2018).
[1220] Ginsburg & Budiardjo, *supra* note 714 at 85.

a two dimensional camera capture that may range from [an actor's] facial expressions … to the [actor's] subtle and dynamic motions."[1221]

The Australian Federal Court addressed a case similar to *Nova* in *Acohs Pty Ltd v Ucorp Pty Ltd*.[1222] In that case, Judge Jessup dismissed Acohs' appeal of a copyright infringement and upheld the finding that the very basic computer program's output is not protected under copyright law,[1223] since "the source code as a work … was not written by any single human author" but, rather, was generated by a computer.[1224] *Acohs* follows a rigorous and conservative approach toward computer programs. Judge Jessup held that users could not be the authors of the program's output since "[t]hey were not computer programmers, and there is no suggestion that they either understood source code or ever had a perception of the body of source code which was relevant to the MSDSs [*i.e.*, the program's output] on which they worked."[1225]

This false equivalency between programming capabilities and the creative process is problematic. A painter need not understand basic chemistry to be assigned copyright in his or her painting; nor must a writer have a mechanical understanding of typewriters or the code underlying Microsoft *Word*.

Where an AI is self-sufficient – capable of performing without any human influence or guidance – a different user-related issue arises. Here, the user might supervise the AI, ensuring it causes no harm or does not diverge from its purpose designation. Under this framework, a user's

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[1221] *Walt Disney*, *supra* note 1219 at 971. In *Torah Soft* the user only insert terms in a "google translate" style and the program searched the biblical database, re-organized the terms according to its designed algorithm and created a matrix of Bible code with the user's term.
[1222] [2010] FCA 577, 86 IPR 492. The case was appealed, though the result concerning the originality and copyright was not changed, see *Acohs Pty Ltd v Ucorp Pty Ltd*, [2012] FCAFC 16, 201 FCR 173; see also Guadamuz, *supra* note 422 at 183-4.
[1223] The program provided guidelines for preparing Material Safety Data Sheet ("MSDS").
[1224] *Acohs*, *supra* note 1222 at para 50.
[1225] *Ibid* at para 52.

authorship might seem unjustified, and the authorship pendulum might shift to the programmer depending on the autonomous level of the program.[1226] In a recent paper, Yanisky-Ravid argues for a user-authorship model in which the users "bear accountability for the systems' production, in addition to the benefits thereof."[1227]

Yanisky-Ravid model is rooted in incentive theory and claims – similarly to Samuelson – that a "legally sanctioned monopoly allows the users to use, sell, or distribute the works more efficiently, as well as to be accountable for avoiding infringements and counterfeits."[1228]

[1226] For example, if the program follows the programmer's instructions or even if the program accomplished the programmer original purpose.

[1227] Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 707. Automated and AI systems pose interesting questions concerning criminal and liability (tortious) implications. First and foremost, these discussion aims to consider who is responsible for AI wrongdoings. I did not address these issues in previous parts for fear of overstretching my dissertation to the far-reaching areas of the legal galaxy. Having stated that, I am aware of the liability and criminal concerns pose by machines both in the context of IP (patent, trademarks, and copyright) and in other areas such as ethics, corporate liability, and economics. See e.g. Amar Kumar Moolayil, "The Modern Trolley Problem: Ethical and Economically-Sound Liability Schemes for Autonomous Vehicles" (2018) 9 JL & Tech & Internet 1; Gabriel Hallevy, *When Robots Kill: Artificial Intelligence under Criminal Law* (Boston: Northeastern University Press, 2013); Rachel Charney, "When Robots Kill: Artificial Intelligence Under the Criminal Law" (2015) 73:1 UTLJ 69; Scherer, Regulating AI, *supra* note 220. In the context of IP, machine-learning or AI systems could potentially infringe a patent (by producing a patented invention) or infringe authors' work (by using a book as part of its database). When there are several parties involved, responsibility might fall to the human individual or company. However, given that under US patent law, for example, "only individuals can infringe on a patent", it might be legally impossible to include AI systems as part of a legal suit for infringement. This situation might prove even more problematic when the connection between the AI's programmer and its output (the infringement) is limited. As I explained in Part I, AI is expected to act on its own in a process that might not be intended (or foreseeable) by its programmers. Obviously, if an AI causes damages, there must be a way to compensate the affected parties. To resolve this harmful potential, we must address several issues. First, resolving data barriers, which I discussed in the previous chapter. Second, creating a database that would be available for AI and machine-learning programs for assessment of infringing potential. However, this solution also poses a challenge – by creating this database, individuals and companies would also expose their innovations, which might not be well accepted. On the other hand, there are government database for patent and we might find a way to develop a method to employ the government database for this purpose. Third, contractual or insurance solutions might present alternative approaches. We could require programmers to insure their AI for possible infringements in the future. See e.g. Bridget Watson, "A Mind of Its Own - Direct Infringement by Users of Artificial Intelligence Systems" (2017) 58:1 IDEA 65 at 69 (in the context of patent infringements). Peter Menell offered a different suggestion to implant specific standards as part of the algorithms code. We could consider creating an algorithm that would be able to provide similar guidelines for AI and machine-learning systems or using these standards in other AI technology. Further, by enabling an AI hybrid standard algorithm, we could save administrative costs – these algorithms could be more efficient in locating infringements and issue decisions. See Menell, Tailoring Legal Protection for Computer Software, *supra* note 612.

[1228] Yanisky-Ravid, Generating Rembrandt, *ibid* at 712.

While Yanisky-Ravid user-authorship approach might seems a prudent legal solution, it is actually far from satisfactory. Her model assumes that the user affects the AI output and thus is the better candidate for authorship. Given expected developments in technology, her model remains either irrelevant or mostly relevant to present computer-generated developments and not to the expected self-sufficient, independent AI, under which the user might become a supervisor.

Yanisky-Ravid's arguments follow CONTU's reasoning, albeit partially. CONTU's report advised awarding authorship to the user since the user is the computer "employer". However, as pointed out by Samuelson, this is easier said than done, given that more than one person uses the program with varying degrees of responsibility.[1229] CONTU noted, however, that the same company usually employs all persons as part of the creation process, making copyright allocation more practical.[1230]

At the beginning of this section, I compared the programmer-user scenario to the two maternal candidates before King Solomon. Wise Solomon "solved" the issue by suggesting cutting the boy in two and giving each woman a half. The story ended with Solomon ruling in favour of the mother who refused to cut the baby because she would rather give the baby to the other mother than kill him. Given the complexities described above, perhaps adopting a Solomon ruling is not a bad idea for programs and users: "cut" the rights in two,[1231] giving half to the programmer and

[1229] Samuelson, *supra* note 423 at 1195, footnote 34. Samuelson is critical that "CONTU thus hints at joint authorship as a solution without indicating just who the joint authors might be."
[1230] CONTU, *supra* note 621 at 45: "When the authors work together as a voluntary team and not as employees of a common employer, the copyright law with respect to works of joint authorship is as applicable here as to works created in more conventional ways, and the team itself may define by agreement the relative rights of the individuals involved."
[1231] In this scenario, I relate to the AI output rights only (and not the rights in the AI program).

half to the user.[1232] Though, as I further explain in the next chapters, this situation might create a different set of co-authorship problems.

3.3.3 The AI

The US Copyrights Office introduced the idea of allocating authorship to a computer back in 1965.[1233] A decade later, CONTU rejected these notions, stating that even if computers could create works independently, they "should not be copyrightable because they had no human author."[1234] As Samuelson aptly notes, CONTU's conclusion incorrectly thought that completely independent computer creation was too speculative and remote to take seriously.[1235]

In the early 1990s, Miller further rejected AI authorship, claiming that "an artificial intelligence expert says that these systems have not yet been able to emulate the capacities of a cockroach."[1236] Miller misses a few important facts: cockroaches are among the most intelligent insects; more importantly, intelligence is not the only factor we should consider.[1237]

True, current legal regimes cannot assign authorship to AI because it lacks legal rights. As I indicated in Part II, however, there are easy legislative solutions to change that. The EU Parliament, for example, urged the EU Commission to consider creating a legal status for robots

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[1232] I understand Solomon's outcome turned out a bit different from what I suggested. Solomon's actual ruling was to give the *entire* baby to the real mother. Using this analogy, Solomon would decide the true *author*, *user* or *programmer* and give him or her *all* the rights.
[1233] Samuelson, *supra* note 423 at 1192, footnote 22: "The crucial question appears to be whether the 'work' is basically one of human authorship, with the computer merely being an assisting instrument, or whether the traditional elements of authorship in the work … were actually conceived and executed not by man but by a machine."
[1234] CONTU, *supra* note 621 at 44.
[1235] Samuelson, *supra* note 423 at 1195, footnote 34. Yet, "CONTU did not say whether, if time proved it wrong about these predictions, it would agree with those who thought truly computer-generated works could not be copyrightable for lack of a human author or would support granting rights to the machine." In any case, it seems that CONTU's was not willing to consider a computer as an author of anything.
[1236] Miller, *supra* note 59 at 1070. In earlier part of his paper, *ibid* at 1043, Miller stated: "The technology has not yet produced a world of copyright without human authors, and there is no reason to believe that we are en route to that world or, even if we are, that we will reach it in the foreseeable future."
[1237] There are other normative reasons for assigning authorship to AIs.

"so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons with specific rights and obligations."[1238] The EU Commission, however, rejected this motion. Nevertheless, there are voices in the EU that favours these ideas. The UK, for example, is more susceptive to the EU Parliament's ideas, at least partially.[1239]

Here are several arguments supporting AI authorship. First, as Samuelson posits, if it "is impossible to tell by hearing the music whether it was composed by a computer or by a human, one might wonder whether the notion of machine authorship ought to be accepted."[1240] Second, the concept of authorship need not be restricted to humans (as I argued in earlier parts). Thirdly, "[a]lthough both the programmer and the user might contribute to the framework within which the computer makes its selections or arrangements of data, the computer actually makes the selections."[1241] Boyden further opines that in cases where the programmer could not predict the computer-generated outcome, and the user only pushes a button, the computer truly "authored" the work.[1242]

Arguments against AI authorship tend to relate to lack of personhood.[1243] Granting AI authorship might set a precedent for granting AIs other legal rights and duties which we might not be willing to do, at least presently. Personhood is a legal concept, though, and our willingness to change other legal concepts changes over time; perhaps we might consider adopting personhood for AIs. Among copyright scholars, Grimmelmann and Miller have both expressed unwillingness

[1238] The EU Parliament Report, *supra* note 185 at 12.
[1239] AI in the UK report, *supra* note 55 at chapter 8.
[1240] Samuelson, *supra* note 423 at 1196-7. Samuelson offers a Turing test copyright standard.
[1241] *Ibid* at 1199.
[1242] Given that "the output is unpredictable and not transparent, even to the authors or users of the program." See Boyden, *supra* note 714 at 389.
[1243] See the personhood discussion, Part I chapter III.

to recognize the possibility of AI authorship.[1244] Grimmelmann explicitly states that "[c]opyright law doesn't recognize computer programs as authors, and it shouldn't."[1245]

The strongest argument against AI authorship is that computers create without any need for incentive. One solution to this would involve coding the program to do as we bid, or in more sophisticated AIs, to make the AI *believe* through coding that its true purpose and destiny is to create works. As speculative as it sounds, this might produce interesting results. AIs might develop to follow human creativity similarly or identically to humans.[1246] Grimmelmann explains:[1247]

> *"Robots that act indistinguishably from humans can also be expected to respond indistinguishably from them in response to legal pressures. A robot that says it cares about not being sanctioned for copying without permission and acts accordingly is a robot that can effectively be deterred from copying."*

Further, even if AI authorship lacks any utilitarian justifications, there are other justifications to consider.[1248] We should be reminded that in the future it might be difficult to justify discriminatory treatment toward AIs and, as Samuelson opines, "unless the Constitution were construed to bar machine authorship, perhaps the copyright statute should be construed to permit it."[1249]

It is clear, in any case, AI authorship would shake copyright's core and force us to re-evaluate basic principles we hold dear. A key question to answer is how to assign copyright to AIs

[1244] Miller, *supra* note 59; Grimmelmann, There's No Such Thing as a Computer-Authored Work, *supra* note 1149 at 403. Grimmelmann offers: "I would like to talk about computer-authored works – I would like to, except that they don't exist."
[1245] Grimmelmann, There's No Such Thing as a Computer-Authored Work, *ibid*.
[1246] Take the humanoid AI robot from the television serious *Star-Trek: The Next Generation* as an example for such an AI.
[1247] Grimmelmann, Copyright for Literate Robots, *supra* note 847 at 680.
[1248] I discuss IP justifications for AI-IP in Part II chapter IV above.
[1249] Samuelson, *supra* note 423 at 1199. Ginsburg & Budiardjo, *supra* note 714 at 7, argue, however, that "even if the concept of 'author' in the U.S. Constitution and the Copyright Act could encompass non-human actors, the machines of today would not qualify as 'author'."

without devaluing the motivation for programmers and users to develop programs or to deliver works to the public. In a human-governed world, ownership is an important element of innovation. But let me temper the above concern. First, no one is arguing in favour of assigning copyright to AIs *today*, since AI has not reached a worthy level of technological advancement. On the contrary, I share Abbott's proposal to strengthen human ownership by extending protection to include a computer program as a possible inventor or author.[1250] Second, by the time computer programs and AIs reach an appropriate level of development that enables human-invention-free creation, the incentive basis for copyright might become obsolete for human creations too – AIs would be able to create independently (fixing and improving its codes).

As Lemley argues, incentive theories might lose their grip for both humans and machines in the future (if not already, to some extent, today) with post-scarcity world where economic incentives no longer foster innovation.[1251] In fact, many humans already choose to create without any real gain (or are over-incentives).[1252]

3.3.4 Joint Authorship

AI authorship could comprise a collaborative framework between the above three players, namely: the programmer, the user, and the AI.[1253] In the future, there are circumstances where a user's

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[1250] Abbott, *supra* note 1017. Given the current level of development, these changes would result in awarding programmers and users more protection in their inventions.
[1251] Lemley, IP in a World Without Scarcity, *supra* note 27; Lemley, Faith-Based IP, *supra* note 465; *Contra* Merges, Against Utilitarian Fundamentalism, *supra* note 469.
[1252] As Lawrence Lessig expressed: "The technological trend means that more is possible with less. The legal trend means that less is allowed than before. The technological trend could give the power to create to an extraordinary range of citizens. The legal trend means that the right to create is increasingly held in a smaller and smaller circle." Lawrence Lessig, "Innovating Copyright" (2002) 20 Cardozo Arts & Ent LJ 611 at 616. See also Silbey, The Eureka Myth, *supra* note 414, which points out that qualitative study suggests most actual creation bears little relationship to economic motivation from IP. Once something is created or invented, individuals will start developing a business strategy.
[1253] For further reading on joint authorship see Melville B Nimmer & David Nimmer, *Nimmer On Copyright:* A *Treatise on the Law of Literary, Musical and Artistic Property, and the Protection of Ideas* (New York: M Bender, 1978-) [Nimmer, Nimmer On Copyright]; Paul Goldstein, *Copyright: Principles, Law, and Practice* (Boston: Little, Brown and Company, 1989). Nimmer and Goldstein offer different views on whether each joint author contribution

contribution will likely be more significant. Video gamers, for example, would "do more than simply react to the story presented onscreen, but participate in creating that story as it unfolds, somewhat like the holodeck on the starship *Enterprise*."[1254]

Boyden argues that in these cases, the programmer and the player both contribute to any resulting creation with ideas, plots, and other elements, "in ways that perhaps neither party could fully predict". Boyden concludes that such creations constitute a joint authorship that emerges "from the operation of the program, instead of a close collaboration between authors."[1255]

The user-programmer joint authorship model is appealing because it resolves the need to choose between the two AI authorship frontrunners.[1256] CONTU agreed that joint authorship constitutes a plausible solution – albeit leaving ambiguous the identity of "authors"[1257] – since:[1258]

> *"When the authors work together as a voluntary team and not as employees of a common employer, the copyright law with respect to works of joint authorship is as applicable here as to works created in more conventional ways, and the team itself may define by agreement the relative rights of the individual involved."*

A few years later, the Congressional Office of Technology Assessment (COTA) expressed the same idea as CONTU but specified what "authors" it had in mind by explicitly contemplating that computer programs could be considered as co-creators:[1259, 1260]

> *"[T]he programmer's, the user's, and even the computer's expressions are intermingled*

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must be copyrightable or whether no individual copyright is required as long as the joint work might be. Nimmer argues that an individual contribution is not required while Goldstein contends that it is. See also Lior Zemer, "'We-Intention' and the Limits of Copyright" (2006) 24:1 Cardozo Arts & Ent LJ 99.

1254 Nicholas, *supra* note 1210 at 122.

1255 Boyden, *supra* note 714 at 387.

1256 Samuelson, *supra* note 423 at 1221.

1257 *Ibid* at footnote 145.

1258 CONTU, *supra* note 621 at 45.

1259 Bridy, The Evolution of Authorship, *supra* note 624 at 396-7.

1260 *Intellectual Property Rights in an Age of Electronics and Information*, *supra* note 628 at 70.

in the process of creation, separating rights in the products of interaction with a program from those in the program itself will become increasingly difficult."

Concerning a programmer-user joint authorship model, the recognition of such a model faces several doctrinal difficulties. For starters, the definition of joint authorship does not match in the US, UK, Canada and other jurisdictions:

- Lacking a definition for "joint authorship", the US defines a "joint work" as "a work prepared by two or more authors with the intention that their contributions be merged into *inseparable* or *independent* parts of a unitary whole."[1261]
- Meanwhile, the Canadian *Copyright Act* defines a work of joint authorship as "a work produced by the collaboration of two or more authors in which the contribution of one author is not distinct from the contribution of the other author or authors";[1262] The UK's *CDPA* offers a definition nearly identical to that of Canada.[1263]

As Vaver explains, intention is crucial under the US joint work approach, "authors must intend their contributions to be merged into a unitary whole before their work is considered joint."[1264] Wu further provides that "the courts have interpreted this to mean that they must intend to be joint

[1261] [Emphasis added]. *Copyright Law of the United States*, *supra* note 627 § 101. See also *Thomson v Larson*, 147 F (3d) 195 at 200 (2nd Cir 1998) (explore the joint work elements); Ginsburg & Budiardjo, *supra* note 714 (explaining intent to merge requirement).
[1262] *Copyright Act*, RSC 1985, *supra* note 590, s 2. Regardless of the joint works applicability in other jurisdictions, it is doubtful that it would be found useful in Canada. As Vaver, *supra* note 237 at 121 opines: "Some courts seem reluctant to admit joint authorship. This tendency may spring partly from the romantic view of the author as Lone Genius, or from a more pragmatic desire to avoid problems that plague co-ownership generally but that are particularly acute for copyright."
[1263] *CDPA*, s 10(1). Defining a work of joint authorship as "a work produced by the collaboration of two or more authors in which the contribution of each author is not distinct from that of the other author or authors." In a similar way to the UK and Canada, Australia's *Copyright Act 1968*, s 10 defines a work of joint authorship as "a work that has been produced by the collaboration of two or more authors and in which the contribution of each author is not separate from the contribution of the other author or the contributions of the other authors." Israel *Copyright Act 2007*, s 1, defines joint work as "a work created jointly by several authors, wherein it is not possible to discern each author's contribution to the work." Thus, the reoccurring element is the inability to discern between each author's contribution to the work. The intent serves no purpose.
[1264] Vaver, *supra* note 237 at 119.

authors … they must intend for each contributor to have an interest in the copyright."[1265] Ginsburg and Budiardjo conclude that given the non-collaborative nature of the relations between the programmer and the user:[1266]

> *"[T]he 1976 Act's requirement of contemporaneous intent to merge specific contributions may deny joint work status to the outputs … And because in many cases the individual contributions of designer and user may be insufficient to justify a claim of sole authorship, the denial of joint work status to these outputs would leave them authorless'."*

A joint programmer-user authorship model also creates practical problems by fractioning ownership rights: "[I]f the programmer of the generator program is given rights because of his contribution,"[1267] other programmers responsible for other parts of the programming might also be considered as joint authors. Joint authorship becomes a never-ending story.[1268]

Finally, there is no general industry standard to make formal agreements between programmers and users for creating a joint work, unlike other joint authorship scenarios like songwriters and performers. Without such a standard, evidencing intention under the US joint work model becomes impossible.[1269] Hence, as Samuelson concludes, the joint authorship model seems "more satisfactory in theory than it would prove in practice."[1270] Moreover, given that a joint

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1265 Wu, *supra* note 14 at 168. Wu further explains that "[t]he reasoning for this interpretation is that persons such as editors, peer reviewers, and research assistants intend their contributions to be merged into the unitary whole, but they do not expect to be accorded the statue of joint authorship."

1266 Ginsburg & Budiardjo, *supra* note 714 at 49. They further reject ideas to make changes to joint works defenition, giving that any such change would require abandoning "the hallmarks of authorship in the traditional copyright world, or to rescind the fundamental principle of technological neutrality." *Ibid* at 111.

1267 Samuelson, *supra* note 423 at 1222. As Samuelson remarked: "Once fractionation begins, it is difficult to stop."

1268 See e.g. the recent decision in *Garcia v Google, Inc*, 786 F (3d) 733 (9th Cir 2015). In *Garcia*, the Ninth Circuit affirmed the district court's denial of the actress Cindy Gracia's motion for a preliminary injunction against the producer of the film *Innocence of Muslims*. Garcia claimed copyright in her acting performance as a join work. In rejecting her claims the ninth circuit stated: "Garcia's theory of copyright law would result in the legal morass we warned against in Aalmuhammed – splintering a movie into many different 'works,' even in the absence of an independent fixation. Simply put, as Google claimed, it 'make[s] Swiss cheese of copyrights'."

1269 In many cases there is a licensing agreement. Samuelson, *supra* note 423 at 1222.

1270 Samuelson, *supra* note 423 at 1224.

authorship is based on co-ownership, it could also result in disagreements between the parties, and exploitation of the work by one party.

The above issues are compounded when contemplating joint authorship between the programmer-user-AI trio. It is not less complex, however, when limiting the discussion to user-programmer joint authorship either. Under the US joint work approach, a user-programmer-AI authorship seems too improbable, as AI possesses no potential for intentionality.[1271] And, as Solum admits, it would be speculative to think that AI could be developed to possess such capabilities, or even prove that AI indeed had an intention if it or its creator claimed it did.

Then again, perhaps these arguments are short-sighted. Future AIs might indeed demonstrate some level of human-like free will, which should satisfy intentionality. Moreover, the rejection of the intent requirement by other jurisdictions makes clear that such intent is not an essential part of the joint authorship equation. In other words, joint authorship for AI is not an impossibility.

In my view, however, a joint authorship model makes a weak basis for AI authorship. My concern is that it imports all the problems encountered in assigning copyright individually to programmers, users, or AIs, with an additional set of difficulties specific to joint authorship.

3.3.5 No Authorship

3.3.5.1 Public Domain

Since choosing authorship seems so difficult, perhaps an ideal solution is to "[l]et the raw output be in the public domain, just as a found object would be."[1272] Here are a few arguments we should

[1271] Solum, *supra* note 236 at 1267. See also Tal Vigderson, "Hamlet II: The Sequel: The Rights of Authors vs. Computer-Generated Read-Alike Works" (1994) 28 Loy LA L Rev 401.

[1272] Samuelson, *supra* note 423 at 1224; Boyden, *supra* note 714 at 391. Litman, *supra* note 994 at 1014, observes that "[t]he current dispute over copyright protection for computer software user interfaces raises analogous issues. User consider.

First, the public domain model avoids immediate challenges to the IP regime, and it is consistent with the approach shared in many jurisdictions (*i.e.*, AI works are not copyrightable).[1273]

Second, building on the theoretical justifications discussed in Part II, IP law is designed to protect *human* creations only: "If it is not clearly necessary to grant the exclusive rights to stimulate creativity, traditional principles would seem to argue that the set of exclusive rights not be awarded to anyone."[1274] As Clifford argues, a "[m]achine itself is not able to claim the copyright because such claims are limited to humans." Since no one has a claim for non-human creations, he contends that the works enter the public domain by default.[1275] Ricketson agrees with Clifford, unconvinced that "such productions should be entitled to any protection at all".[1276] Ricketson and Clifford both express a prominent argument in AI personhood debates: "[O]nly natural humans deserve legal rights."[1277] I challenged this argument in Part I.[1278]

Both American and Canadian copyright frameworks seem to favour the no-authorship approach for AI. The US Copyright Office stated explicitly that copyright law only protects creative human works founded in the mind.[1279] Under Canada's *Copyright Act*, Mark Perry and

interfaces are themselves languages--the languages people use to operate their computers. Because user interfaces have the attributes of languages, users learn them as if they were languages. To the extent that individual commands or keystrokes in popular user interfaces are understood by users as individual words, they must belong to the public domain simply because they are elements of language. The public's demand for unrestricted use of language will not tolerate private ownership of words or word-analogues under the rubric of copyright."

[1273] Butler, *supra* note 765 at 734: "If not found the product of a human author, these works will not be afforded copyright protection under the Act." As I explained in Part II, under current copyright laws, this is true in many other jurisdictions.

[1274] Samuelson, *supra* note 423 at 1225.

[1275] Clifford, *supra* note 803 at 1695.

[1276] Ricketson, *supra* note 795 at 29.

[1277] Solum, *supra* note 236 at 1260.

[1278] First, its not completely true – we do award legal rights to non-humans (corporations and ships for example). Second, Solum, *ibid* at 1261, stated that this statement "is akin to American slave owners saying that slaves could not have constitutional rights simply because they were not white or simply because it was not in the interests of whites to give them rights." See also Bryson, Robots Should Be Slaves, *supra* note 244.

[1279] See *supra* note 1016.

Thomas Margoni endorse works belonging to the public domain, "in absence of direct human intervention."[1280] In short, no-authorship models seem entirely possible under existing frameworks.

The public domain model also conforms with theoretical IP justification. A primary concern of IP law is increasing and spreading the public pool of knowledge. Such a goal is certainly achieved by relinquishing computer-generated/AI works to the public domain. Yochai Benkler discusses the importance of the free distribution of information, knowledge, and culture for society,[1281] and suggests that "enforcing copyright law leads to inefficient underutilization of copyrighted information."[1282]

Ginsburg also encourages knowledge distribution, noting the evolution of the creative process and the diffusion of creativity due to the increase of the "Wikipediafication of content." Thus, Ginsburg contends, maybe "no one can fairly own a copyright, either."[1283] I discussed similar IP and copyright ideas, challenging copyright regimes in earlier parts.[1284]

As noted above, there is little consistency about who the author is of computer-generated/AI. As Samuelson explains, it is also unclear if allocating computer-generated/AI output's rights to either the programmer or the user would motivate creations. The programmer is rewarded for creating the program (through selling or licensing it) and the user is motivated by

[1280] Perry & Margoni, *supra* note 779 at 11.
[1281] Benkler, *supra* note 617. Benkler, at 25, argues against the *Digital Millennium Copyright Act*: "The single most threatening development at the physical layer has been an effort driven primarily by Hollywood, over the past few years, to require the manufacturers of computation devices to design their systems so as to enforce the copyright claims and permissions imposed by the owners of digital copyrighted works. Should this effort succeed, the core characteristic of computers – that they are general-purpose devices whose abilities can be configured and changed over time by their owners as uses and preferences change – will be abandoned in favor of machines that can be trusted to perform according to factory specifications, irrespective of what their owners wish."
[1282] *Ibid* at 37.
[1283] Ginsburg, The Author's Place in the Future of Copyright, *supra* note 988 at 152.
[1284] See the discussion in Part II chapter II(B)(1); Lemley, IP in a World Without Scarcity, *supra* note 27; Lemley, Faith-Based IP, *supra* note 465; *Contra* Merges, Against Utilitarian Fundamentalism, *supra* note 469.

transforming the raw material into something he or she can sell or promote to the public. Hristov disagrees, stating that "[w]ithout an established period of protection, there is no tangible incentive for developers of AI machines to continue creating, using and improving their capabilities", which could "ultimately limit innovation […] resulting not only in the decline of AI but also in the decline of innovation across a number of related sectors."[1285] Hristov, however, fails to acknowledge the effect of patents and design law protection, which might be available to programmers and developers.

I find Samuelson's argument more persuasive between the two positions. First, there is a consensus that an AI program is patentable or copyrightable, which means that only the output's authorship, inventorship or ownership presents an issue. Thus, contrary to what Hristov says, programmers and inventors are incentivized for their creations.[1286] Second, Hristov's argument is more relevant to the present stage of developments, and he does not consider a future where AI is coded to be incentivized.

A clear issue with the public domain model is that it diminishes the user's incentives to bring their creation to the public. As Samuelson observes, "the best reason to allocate ownership interests to someone … is that someone must be motivated",[1287] if not to create the work, then at least to make it publicly available. Without ownership rights, users might be motivated to withhold, falsify, or change the work so they can be assigned authorship, which is the worst possible outcome.

Rewarding "those who bring innovation to the market has always been part of the realities

[1285] Hristov, *supra* note 422 at 438.
[1286] I agree that if the purpose of the program is to generate works or music then – and only then – Hristov might be right.
[1287] Samuelson, *supra* note 423 at 1226.

of the intellectual property system, even if not part of the sentimental ideology that pervades public thinking about intellectual property."[1288] Samuelson's view here relates mainly to current developments, however, and even in our current landscape, we organize information systems to share and connect. This is a good indication that future AI creativity would spread through similar means of communication; in other words, there is no reason to assume that future AI would lack motivation to share its creations with the public. Moreover, if future AIs possess human traits, its motivations to share its creations would likely be humanized. Admittedly, some of my above assumptions are loosely grounded. But my point is that we should not preclude the possibility that AIs – not users – may equally or more so take responsibility for bringing innovation to the public, and those allocating rights needs to anticipate this possibility.

There is yet more support for no-authorship or public domain models. In a recent paper, Yanisky-Ravid and Liu argue in favour of abolishing the patent law system for AI inventions, because AI inventorship poses significant problems through its multiple potential rights-holders.[1289] They contend that granting exclusive rights to inventors does not "significantly incentivize investors". Among other claims, they argue that patent law is inflexible and may "impede future technological progress by making it harder for other AI systems to build on earlier inventions."[1290]

While Yanisky-Ravid and Liu focus on patents and not copyright law, they share core arguments with the no-authorship model. First, AI's output could produce patentable, design rights, and copyrightable material simultaneously. Second, the development environment is

[1288] *Ibid* at 1227.
[1289] Yanisky-Ravid & Liu, *supra* note 293. Benkler, *supra* note 617 at 438 expresses similar opinion stating that "innovation in the software business has flourished without patents, and there is no obvious reason to implement a new exclusive right in a market that seems to have been enormously innovative without it. Most important, software components interact with each other constantly."
[1290] Yanisky-Ravid & Liu, *ibid* at 2252.

similar and involves many contributors, including other significant entities such as data suppliers, "trainers", operators of the AI systems, and investors.

3.3.5.2 Government Ownership[1291,1292]

Another solution similar to the public domain model is the government model, in which ownership of computer-generated or AI output falls to the state by default. Canada already embraces some default government ownership: Section 12 of the *Copyright Act* provides circumstances in which the Crown owns copyright.[1293] In Canada, this mechanism is based on a different rationale. Vaver suggests that section's 12 opening "without prejudice to any rights or privileges of the Crown" is a reference to an ancient English prerogative – the Crown's sole right to print whatever is written.[1294]

One can argue that the government should benefit from its investments in projects and employees. The government is part of the people, and its officials serve the people. However, as Vaver points out, people may still be charged for government's works.[1295] Regardless, there is an existing legal framework to draw on, and it might be argued that the government could serve public needs most efficiently and effectively.[1296]

1291 I should clarify that by "government" I mean governments in democratic countries. In communist or totalitarian regimes (like China, Iran, Russia, *etc*.), the concept of ownership is different, and the government own large chunks of the IP directly or indirectly through government owned entities.
1292 I should also clarify that this argument is relevant to AI's output ownership only.
1293 *Copyright Act*, RSC 1985, *supra* note 590, s 12: "Without prejudice to any rights or privileges of the Crown, where any work is, or has been, prepared or published by or under the direction or control of Her Majesty or any government department, the copyright in the work shall, subject to any agreement with the author, belong to Her Majesty and in that case shall continue for the remainder of the calendar year of the first publication of the work and for a period of fifty years following the end of that calendar year."
1294 David Vaver, "Copyright and the State in Canada and the United States" (1996) 10 IPJ 187 [Vaver, Copyright and the State].
1295 *Ibid*.
1296 *Ibid* at 202: "The government could advance economic or social welfare by encouraging or discouraging particular activities through giving or withholding copyright permission, and charging or not charging royalties." On the other hand, as Vaver further suggests, "Whether the government can be trusted even to recognize when an activity may 'assist in the achievement of program objectives' is doubtful."

Granting the state ownership to AI output might seem like a more radical approach than the public domain model since it assumes that only the government can decide how to allocate rights. Further, a government model might hinder free speech and become an effective censorship tool in cases in which the government prefers to prevent access to specific creations.[1297] Additional arguments can also be made against the claim that the government would be best at allocating rights. Governments might not be that efficient, and this could lead to higher taxes.

On the other hand, a government model establishes ownership for the public benefit. The state could establish trust funds for public causes. As already suggested, the AI could be named the work's "author", while the government retains entitlement to use the AI's output for social purposes, like Norway's use of oil revenues in establishing its Government Pension Fund.[1298]

The challenges between private and public ownership models on a relatively small scale were discussed for ownership of university IP (mostly patents). This discourse produced similar arguments to those detailed above.[1299] Under the American *Bayh-Dole Act*, for example, universities ought to take the title for inventions where the Federal Government funded the research for those inventions.[1300]

[1297] As Vaver shows, this is historically accurate, see *ibid* at 194-5. See also Benjamin Kaplan, *An Unhurried View of Copyright* (New York: Columbia University Press, 1967).
[1298] See Part II, chapter IV(E) and footnote 923.
[1299] It could be reasonable to claim that past willingness to accept patent ownership for universities might, under certain conditions, lead to accepting a government-based ownership model for AIs works. There is, however, a "slight" difference between granting a university IP rights where research is government-funded, and giving the state IP rights for something it did not actually fund. On the other hand, building on the IP theories chapter, we can argue that the public – via the government – is party to any creation.
[1300] See Samuel Estreicher & Kristina A Yost, "University IP: The University as Coordinator of the Team Production Process" (2016) 91 Ind LJ 1081 at 1082. Estreicher & Yost explain that prior to the *Bayh-Dole Act, 1980* "there was no uniform law that governed who had ownership rights to inventions from federally funded research. Each agency had its own regulations, but ownership of inventions resulting from federally funded research typically belonged to the government," *ibid* at 1087. The *Bayh-Dole Act* changed that, and "on federally funded projects, the university, which is a party to the funding agreement, has the right to retain title in any subject invention." Only if the university fail to comply with the Act, "the federal government may receive title to a subject invention." *Ibid* at 1088. For example, if the university does not choose to elect title "the government may grant requests for retention of rights by the inventor" (which might be the faculty professor).

Then again, even the university model is weak. Estreicher and Yost argue that default university ownership can shift a university's research focus to revenue and commercialized research,[1301] and more profitable research areas.[1302] Other concerns arise that governments are not in the best position to pursue licensing.[1303]

Though a sole government ownership model has lower transaction costs than a multiple ownership model like joint authorship,[1304] this seems the only reason in support of such ideas. Otherwise, government ownership model seems problematic and unwieldy.

3.3.6 Authors in Law

Earlier sections in this part discussed authors-in-fact: Those who directly had a hand in creating a copyright-entitled work. Authors-in-fact for AI output may include the user, programmer, and AI, depending on their influence on the final product. In this section, I look beyond authors-in-fact to authors-in-law: Fictitious "authors" granted legal authorship for AI creations despite not necessarily being involved in the creation process.

In this chapter, I consider the most frequently discussed author-in-law classes in an AI context: derivative work, work-made-for-hire, and fictitious human authors. These classes could establish a legal basis for computer-generated/AI copyright either by creating an alternative human author or by considering the creation part of the original work (program).

[1301] *Ibid* at 1091.
[1302] Estreicher & Yost, *ibid* at 1095; Pat K Chew, "Faculty-Generated Inventions: Who Owns the Golden Egg?" (1992) Wis L Rev 259 at 305-6.
[1303] As shown, universities slow down the commercialization process and create a bottleneck in the process. See e.g. Teresa Amabile et al, "The HBR List: Breakthrough Ideas for 2010: A Faster Path from Lab to Market" (January-February 2010), online: *Harvard Business Review* <hbr.org/2010/01/the-hbr-list-breakthrough-ideas-for-2010>.
[1304] Estreicher & Yost, *supra* note 1300 at 1100-1.

Authors-in-law is a tempting route, but I believe it will lead to adverse outcomes. It also provides an example of how the legal community sometimes tries to resolve challenges of computer-generated/AI by avoiding the real issues.

3.3.6.1 Derivative Works

The derivative work doctrine is based on creating a fictitious author.[1305] Derivative work encompasses any expressive work based on pre-existing works – either singular or multiple (*e.g.*, mash-ups) – and in any form under US laws in which the pre-existing work is "recast, transformed, or adapted."[1306] Copyright law defines derivative works in the US broadly, and "appears to reach all works 'based upon' a copyrighted work, regardless of how it transformed or recast."[1307] In contrast, the Canadian *Copyright Act* does not provide a broad definition, though nevertheless might reach similar results.[1308]

For AI, we can argue that the basic code originated from the programmer, so every work that the AI creates is derivative from the original code. All AI output is therefore derivative work under copyright law.[1309] This argument, though reasonable, is not persuasive. AI code is no

[1305] This concept is not unique for IP laws, given that in many jurisdictions "the definition 'author' is an artificial one." *The Making of Modern Intellectual Property Law*, *supra* note 408 at 340. In the UK, for example, "the author of a film is both the producer and principal director. The author of a sound recording is its producer, of a broadcast the person making the broadcast, while the author of a typographical arrangement is the edition's publisher."
[1306] Bridy, *supra* note 423 at 64; Dorotheou, *supra* note 423 at 89-90. A derivative work is "a work based upon one or more preexisting works, such as a translation, musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction, abridgment, consideration, or any other form in which a work mat be recast, transformed, or adapted. A work consisting of editorial revisions, annotations, elaborations, or other modifications, which, as a whole, represent an original work of authorship, is a 'derivative work'." *Copyright Law of the United States*, *supra* note 627 § 101; see also Lemley, Menell & Merges, *supra* note 881 at 486.
[1307] Samuelson, *supra* note 423 at 1212.
[1308] *Copyright Act*, RSC 1985, *supra* note 590, s 3(1); *Théberge v Galerie d'Art du Petit Champlain Inc*, 2002 SCC 34 at para 73: "I should note that while there is no explicit and independent concept of 'derivative work' in our Act, the words 'produce or reproduce the work ... in any material form whatever' in s. 3(1) confers on artists and authors the exclusive right to control the preparation of derivative works such as the union leaflet incorporating and multiplying the Michelin man in the Michelin case … To the extent, however, that the respondent seeks to enlarge the protection of s 3(1) by reading in the general words 'recast, transformed, or adapted' as a free-standing source of entitlement, his remedy lies in Parliament, not the courts."
[1309] Samuelson, *supra* note 423 at 1212 further explains: "[I]t is hard to deny that a computer-generated work seems to be 'based upon' the underlying program. To the extent that it 'comes from' the generator program, it was 'derived'

different from DNA; it is the basis for the AI's "body". As AI technology evolves, considering an AI's creation as a derivative work becomes more equivalent to attributing any work by a child to his or her parents. Dorotheou agrees:[1310]

> *"The connection between the programmer's work … and the final work is too remote … the device is thinking entirely by itself. There can no longer be a link to the programmer, irrespective of whether the programmer was the original creator."*

Perhaps more importantly, AI works would not contain the original code that produces them, as Bridy explained, "[t]hey are not copied from the underlying code, and they are not substantially similar to the underlying code."[1311] Legislators could, of course, amend the derivative work definition to include "works that do not borrow from the original work."[1312] But such amendments are not warranted. As Bridy admitted, "removing the requirements of actual borrowing would unduly exacerbate existing boundary problems, making a wider range of conduct actionable as infringement and potentially inhibiting creativity", especially in the digital environment.[1313]

Finally, recognizing computer-generated or AI works as derivative works would not resolve any ownership issues, since "such a classification would not automatically make the owner

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from the operation of the generator program." Perry & Margoni, *supra* note 779 at 8 concludes: "[E]ven if Canadian law recognizes a specific right of derivative work and vests it to the author of the original work, such right is limited, narrower than that of the southern neighbour."

[1310] Dorotheou, *supra* note 423 at 90.

[1311] Bridy, *supra* note 423 at 64. Bridy echoes Samuelson's conclusion: "In general, computer-generated works do not incorporate recognizable blocks of expression from the underlying program or from data base that the program draws upon in the generative process. For this reason, computer-generated output should not automatically be considered 'derivative works' within the meaning of the copyright statute merely because in common parlance it could be said that the output was 'derived' from or 'based upon' the generator program."

[1312] *Ibid*. Samuelson, *supra* note 423 at 1212-1213 shows that Congress did not intend to consider computer-generated works – automatically and invariably – as derivative works. First, Samuelson explains, that when the 1976 Act was passed, the issue of computer-generated authorship was still being considered by CONTU. Second, CONTU's final report concluded that the holder of computer-generated output should be the user and not the programmer. Third, there is no evidence that Congress intended to expand the derivative works definition. Samuelson concludes, *ibid* at 1214: "[N]othing in the legislative history indicates that Congress intended to expand the set of rights copyright owners would have over derivatives by creating a general derivative work right."

[1313] *Ibid*.

of the copyright in the generative code the owner of the copyright in the procedurally generated work derived from it."[1314]

Where derivative works do not incorporate any element from the code that produced it, the copyright in the work is fully owned by the work's author (*i.e.*, the computer-generated, AI or user). In Bridy's words, there is "no preexisting material in the new work to sustain a copyright claim by the author of the original work, leaving a non-legal person as the only copyright claimant."[1315]

3.3.6.2 Work Made for Hire

The second author-in-law option for AI is the "work made for hire" [WMFH] doctrine.[1316] This is where parties agree – beforehand – that the person commissioning or funding the work will take authorship despite not authoring the work (*e.g.*, a ghost-writer penning a celebrity's autobiography will sign a WMFH contract to maintain the story that the celebrity wrote it).[1317] Hence, "the employer or other person for whom the work was prepared is considered the author for purposes of this title",[1318] and the copyright in any work that was created "within the scope of employment or commissioned by independent contractors" belongs to the employer.[1319]

[1314] Bridy, *supra* note 423 at 65.
[1315] *Ibid*.
[1316] Work made for hire is "a work prepared by an employee within the scope of his or her employment." *Copyright Law of the United States*, *supra* note 627 § 101. See also *Reid*, *supra* note 1026, in which SCOTUS addressed the doctrine's definition.
[1317] The EU's *Software Directive* allocates the employer all rights in the employee's computer program (though it does not make the employer an author). *Software Directive*, *supra* note 641 at art 2(3): "Where a computer program is created by an employee in the execution of his duties or following the instructions given by his employer, the employer exclusively shall be entitled to exercise all economic rights in the program so created, unless otherwise provided by contract."
[1318] *Copyright Law of the United States*, *supra* note 627 § 201(b).
[1319] Lemley, Menell & Merges, *supra* note 881 at 488.

Several scholars have reflected on the applicability of the WMFH doctrine to computer-generated or AI works.[1320] The doctrine might enable attributing the copyright ownership of the AI's work, to the programmer, on the assumption that the programmer is the AI's employer. This makes the doctrine "the least disruptive and most practical solution to the issue of AI generated works falling into the public domain."[1321] In that way, Bridy explains, we can "avoid the expedient logic that conflates the author's author (*i.e.*, the programmer) with the actual author (*i.e.*, the generative program)."[1322]

Bridy favours WMFH over derivative works since WMFH "can be more easily modified without undue collateral expansion of the scope of copyrightable subject matter",[1323] and[1324]

> *"[I]s a more fitting framework within which to situate the problem of AI authorship because it represents an existing mechanism for directly vesting ownership of copyright in a legal person who is not the author-in-fact of the work in question."*

Hristov echoes Bridy's proposal, arguing for applying WMFH to AI programs by a flexible interpretation of the terms "employee" and "employer" in a way "that an 'employer' may be considered as someone who employs the services of another entity in order to achieve a goal or complete a task."[1325] Under this interpretation, an AI's programmer might be considered its employer. This approach, however, is not a comprehensive solution. For example, Hristov's suggestion is too broad in scope and will effectively include all freelances.[1326]

[1320] Samuelson, Bridy, Hristov and recently Yanisky-Ravid are only a few.
[1321] Hristov, *supra* note 422 at 440.
[1322] Bridy, *supra* note 423 at 66.
[1323] *Ibid* at 63. Bridy further offers that "[t]he work made for hire also avoids the predicament of vesting rights in machine – a problem the derivative work doctrine cannot get around."
[1324] *Ibid* at 66.
[1325] Hristov, *supra* note 422 at 446.
[1326] D'Agostino, *supra* note 408, explains how in the digital era, publishers exploit freelances' works, making freelances vulnerable. Thus, expanding WMFH definition or interpreting WMFH broadly to include AI's as freelances, might only exaggerate the difficulties D'Agostino observed.

Bridy claims that her suggestion is no different from the exceptions to computer-generated works found in other jurisdictions that create a "legal fiction of authorship by means which copyright vests as a matter of law in a party who is not the author-in-fact."[1327] Section 178 of the *CDPA* (reading with section 9(3)), for example, establishes that a computer-generated work is protected under the UK copyright laws.

Bridy's argument sounds appealing, but the WMFH might *de facto* recognize AI as an employee and thus create a new working class, which is a far-reaching proposition. Bridy acknowledge this problem, stating that current copyright laws do not catch computer-generated works (or AI) in their legal definitions (sections 101(1) and (2)) "because the relationship between the programmer and the authoring code is not an employment relationship in the agency sense [and] they are not among the nine categories of commissioned works."[1328] Bridy suggests incorporating the UK computer-generated model by stating that a WMFH is "a work generated by a computer in circumstances such that there is no human author of the work." In that case, the owner of the work might be the programmer who would be considered the AI's employer.

However, as I explain below, allocating ownership to the programmer might be normatively unjust. And as Bridy herself pointed out, the user, the program, and the programmer's employer of the programmer are all worthy candidates for authorship or ownership.[1329] Bridy's argument also ignores other computer-generated/AI authorship models such as joint-authorship or public domain models. Vaver adds that Bridy's model is far from adequate for Canada, because of the significant difference between the WMFH doctrines in the US and Canada.[1330] Hence, Bridy's

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[1327] Bridy, *supra* note 423 at 67.
[1328] *Ibid* at 68.
[1329] *Ibid*.
[1330] In Canada, the "employer may become only an 'owner' of copyright, never an 'author' (otherwise the human author loses all moral rights)." David Vaver, "A response to 'Prof Annemarie Bridy Asks: How Human Does An

proposition is not a comprehensive global solution. Even if one makes necessary changes to the doctrine, it is inadequate normatively: We can allocate legal rights to AI, or we can reject the idea, but WMFH only avoids the real issues.

Yanisky-Ravid also developed WMFH as a prime model for AI authorship. In a recent paper, she suggested a "new" model "that sees AI systems as independent workers or employees of the *users*."[1331] Her model builds on Bridy's argument but instead leans more towards the user, and not the programmer, as the employee.[1332] Her gist is that the user operates the program (*i.e.*, gives it directions), takes the financial risk, and supplies the energy. Yanisky-Ravid justifies her take from a policy and practicality perspective, stating that "it makes sense to incentivize people or firms as well as other entities to use creative AI systems to create works of authorship because doing so will most efficiently promote the proliferation of the devices and the works they produce."[1333]

Yanisky-Ravid argues that "most of the time, the candidates who are involved in the development and manufacture of the AI system do not meet the threshold of authorship."[1334] Thus, she concludes, the programmer and other players should not be the beneficiaries (employees) of the AI creation, because "[t]he large number of players significantly weakens each player's individual contribution and thus the bond between the software programmers and the products produced by the AI systems."[1335]

Author Need To Be?'" (2011), online (blog): *IPilogue* <iposgoode.ca/2011/08/prof-annemarie-bridy-asks-how-human-does-an-author-need-to-be/#sthash.rkdaSkOL.6GfnaMH6.dpuf>.

[1331] [Emphasis added]. Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 708.

[1332] *Ibid* at 707. See also Yanisky-Ravid & Liu, *supra* note 293 at 2231.

[1333] Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 712.

[1334] *Ibid* at 691. See also Yanisky-Ravid & Liu, *supra* note 293.

[1335] Yanisky-Ravid, Generating Rembrandt, *supra* note 236 at 692.

Yanisky-Ravid's vision is narrow-minded; it might be useful at our current computer-generated phase, but not to more advanced stages of AI. For example, part of the model is based on the *instructions* a user could or would give to the program. In the future, however, an AI might create works with *no* human influence, therefore with no instructions. Further, she claims that this model "also solves the inherent problem of multiple players being involved in the development of AI systems."[1336] But, there is no real reason why more than one user cannot "employ" the AI program, or why a multiplayer model presents such a problem to copyright. AI does not change our current development process, which involves as many players as Yanisky-Ravid describes.

From a policy perspective, Yanisky-Ravid's WMFH model is "safe" – it provides stability and preserves the basic principles of copyright law. It solves liability issues by establishing that the user, as the AI's main contractors, is responsible for the outcomes. On the other hand, as Bridy remarks, implementing the model will require changes to current legislation.

Even if we accept one of the WMFH proposals, normative concerns arise that we should consider. Bridy and Yanisky-Ravid each establish a working status – and maybe even a limited personhood status – for AI. Several scholars argue that these scenarios might create a "slave" status for AIs and robots.

Joanna Bryson suggests "that robots should be built, marketed and considered legally as slaves, not companion peers."[1337] Bryson pointing to the risks that AIs or robots pose to society. First, over-identification (personalization or humanization) with AIs or robots is time-consuming, requires allocating resources, and might result in social isolation. On the other hand, there are

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[1336] *Ibid* at 713.

[1337] Bryson, Robots Should Be Slaves, *supra* note 244 at 63. Bryson might use a provocative tone, however, she does not mean to make any comparison – nor do I – between human slavery and robots' so-called slavery, as she further explains: "[W]hen I say 'Robots should be slaves', I by no means mean 'Robots should be people you own'. What I mean to say is 'Robots should be servants you own'."

benefits like providing companionship for the elderly. Second, Bryson expresses concern on an institutional and government level about the risks AI or robots pose to legal personhood by making them liable for their actions and removing liability for the human programmer or user, or a government or corporation.

Bryson's argument is appealing, but there are social costs in treating AIs or robots as "slaves". We can assume that as technology evolves AIs or robots will likely anthropomorphize, as they are modelled to resemble humans. In that scenario, treating AI or robots as servants might affect the way humans treat each other by inciting violent tendencies or become indifferent to other people.[1338]

3.3.6.3 The Fictitious Human Author

The third author-in-law model is the fictitious human author, discussed in papers by Wu and Timothy Butler. Under the fictitious human author model, whenever a court finds a computer/AI as the author of a given work, "the court should presume the existence of a fictitious human author and assign copyright to the owner of the AI."[1339]

Butler introduced this theory in 1982,[1340] but Wu developed it furthermore recently. While Butler assumed that copyright would be assigned to the owner of the AI program, which is the "problem-specifier or the computer owner, either individually, jointly or in part,"[1341] Wu suggests

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[1338] Kathleen Richardson explains how sex robots might affect human behaviour: "I problematized these assumptions by showing how arguments for sex robots reveal a coercive attitude towards women's bodies as commodities, and promote a non-empathetic form of encounter … In my own work I argue that the buying of sex promotes a disruption to empathy, because the buyer of sex is not relating to the person as a subject, but an object." Kathleen Richardson, "Sex Robot Matters: Slavery, the Prostituted, and the Rights of Machines" (2016) 35 IEEE Tech & Soc Magazine 46 at 48-49.
[1339] Wu, *supra* note 14 at 159.
[1340] Butler, *supra* note 765 at 744-745: "When a court finds a given product of AI software is 'authored' by machine rather than a person, the court should presume the existence of a fictitious human author and assign the appropriate fractions of the copyright rights to the owner of the AI software copyrights, the problem-specifier or the computer owner, either individually, jointly or in part."
[1341] *Ibid*.

a broader vision that includes (and maybe even favours) the user. According to Wu, ownership "should be assigned to whoever owns the copyright to the AI, on the assumption that this will usually be the person who decides whether the AI should generate future works."[1342] The fictitious human author model's greatest advantage is that it avoids the somewhat "painful" discussion of AI personhood.

Wu offers this model as a last resort, stating that "if the computer program generates a poem that is not repetitive or predictable [*i.e.*, no fixation], and the user's contribution is minimal [or there is no user at all like an AI humanoid robot], then the author of the poem may be the computer program (the AI) itself."[1343]

Declaring AI authorship, however, is not the end of the discussion. The court must still determine if the AI reaches a level of sophistication enabling it to generate further works: "If awarding the copyright to the AI will stimulate the AI to create future works, then the AI should receive copyright protection; if not, then the court should assign the copyright to the owner of the computer program under the Fictional Human Author Theory."[1344]

3.3.7 A Moral Rights Model

For my final authorship consideration, I want to return to moral rights doctrine, discussed earlier in Part II. There, I explained why the moral rights model poses an alternative to other ownership models. First, it recognizes the personal connection that future AI might develop toward its works and creations.

[1342] Wu, *supra* note 14 at 161.
[1343] *Ibid* at 174.
[1344] *Ibid*.

Second, by recognizing the AI's contribution and providing limited protection to those works, we could differentiate and prevent any confusion between AI and human works. Third, by allocating moral rights to AI creations, we resolve concerns about human appropriation of AI's works. While moral rights model is not a fulsome solution to AI authorship, it might provide an alternative to the next phase of AI development and is worth exploring.

Any AI moral rights model should be implemented in phases. Our current stage of development needs no moral rights extended to computer-generated programs since no attachment could be established.

Moral rights should engage only when we reach an independent level of computer-generated or AI development in which there would be very limited human involvement (or no human involvement). Then, and only then, we should consider extending limited moral rights (attribution and integrity rights only) to computer-generated or AI creations, either as sole or joint authors.

My moral rights endorsement is likely to face criticism.[1345] As I explained in Part II, moral rights historically were designed to protect human rights. Even if countries that acknowledged moral rights become willing to accept AI moral rights, those jurisdictions that do not (especially for computer programs) will frustrate any attempt at global change.

Still, the moral rights doctrine contains advantages that we can use to enhance AI authorship. First, it allows us to distinguish between a creation's recognition and integrity, and its ownership. Even if AI cannot comprehend creation as humans do, we strengthen the integrity of

[1345] Boyden, *supra* note 714 at 391: "Emergent works likewise need no protection under a moral rights theory as the expression of a human being's personhood, not under a natural rights theory as intellectual labor, because again there is neither human creativity nor labor involved in their production."

those creations and make falsification or false attribution of AI art to humans more difficult by assigning moral rights.

Second, the moral rights arguments are an extension of developing AI personhood in copyright. If we accept AI personhood and AI's entitlement to limited legal rights, we should not exclude the implementation of AI moral rights.

3.4 RESHAPING COPYRIGHT

Any AI authorship model must also consider other copyright standards. Originality serves as a copyright guardian – if a work is not original, it is barred from protection. Originality dictates the presence of certain elements for a work to be considered "original", and in many jurisdictions, such elements may include creativity.

Originality is an important criterion of any creation, AI included. However, establishing originality might prove difficult for non-humans. Dan Burk expresses the paradox and absurdities in copyright, which urge us to accept impossible and nonsensical assertions.[1346] Machine works were always considered inferior to human works – how could a simple processor of data satisfy the originality standard? However, with the advance in computer programs, these perceptions are changing. Machine-learning algorithms prove that a machine can make original and creative decisions, which could even surprise its programmers.[1347]

My argument is simple and straightforward: We should determine mechanical labour as original in the same manner we establish non-mechanical originality. Indeed, there are works made by machines that should not be considered original. However, not *any* mechanical work is unoriginal *per se*. Similarly to programmers, AI could express originality in changing its code, offering creative ways to produce works, or making decisions in selecting its sources. There are many creative works generated by computers/AI systems in music, art, literature, *etc*.[1348]

[1346] Dan L Burk, "Method and Madness in Copyright Law" (2007) 3 Utah L Rev 587.
[1347] As with the program that beat the top Chinese Go player in a move no one anticipated, see Gibbs, *supra* note 772.
[1348] Shlomit Yanisky-Ravid & Luis Antonio Velez-Hernandez, "Copyrightability of Artworks Produced by Creative Robots and Originality: The Formality-Objective Model" (2018) 19 Minn J L Sci & Tech 1 at 7. However, as Yanisky Ravid & Velez-Hernandez have offered, at least in the US, the legislator did not provide a clear definition for artwork or art. *Ibid* at 31.

Unfortunately, the current legal discourse in copyright law is more interested in establishing how we can obtain originality in a more technical sense instead of how we can perceive what is original.[1349] It is a subjective process, which is more biased toward non-human creations.

There are several innovative suggestions to change copyright standards to accommodate AI authorship. Abbott, Joseph Miller, Jeffrey Harrison, Edward Lee, Boyden and, recently, Yanisky-Ravid and Antonio Velez-Hernandez argue for adopting a more inclusive benchmark facing the difficulties with the current copyright framework.[1350] Indeed, as Wu observes, "as computer programs become more and more sophisticated … it becomes clear that a more sophisticated test is required to serve the interests of justice and the goals of copyright laws."[1351]

The outline of this chapter is as follows. First, I briefly survey the originality standard as it developed across jurisdictions. Originality is not a coherent concept. It varies between different systems of law, reflecting local cultural and legal norms.[1352] As with many other legal concepts, originality is a living and breathing concept, adapting and evolving over time.[1353] I will contend that the originality standard should apply to *all* creations without discriminating between humans and non-humans. Abbott agrees, stating that "it should be irrelevant whether the content comes

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[1349] Yanisky-Ravid & Velez-Hernandez, *ibid* at 32.

[1350] Edward Lee, "Digital Originality" (2012) 14 Vand J Ent & Tech 920 at 924; Joseph S Miller, "Hoisting Originality" (2009) 31 Cardozo L R 451 at 457-463 [Miller, Hoisting Originality]. Miller and Abbott are relying on patent law and non-obviousness requirements. Harrison expresses similar views suggesting tweaking Feist's modicum of creativity, introducing the "modicum-times-2", which "might be articulated as 'requiring more than minimal expertise, skill, taste, or judgment' and that the work be 'capable of being distinguished from other ordinary objects'." See Jeffrey L Harrison, "Rationalizing the Allocative/Distributive Relationship in Copyright" (2004) 32 Hofstra L Rev 853 at 867. Parchomovsky & Stein, *supra* note 427, ties between the level of originality (and creativity) to copyright protection.

[1351] Wu, *supra* note 14 at 134.

[1352] Bently & Sherman, *supra* note 406 at 94, explain, "it is worth bearing in mind that, whatever test is applied, the question of whether a work is original inevitably depends on the particular culture, social, and political context in which the judgement is made … what is seen as original may change over time."

[1353] Joseph Raz, *Ethics in the Public Domain: Essays in the Morality of Law and Politics* (New York: Clarendon Press, 1994).

from a person or machine, or particular type of machine."[1354] We should, therefore, develop a new standard for originality based on the concept of creativity.[1355] Second, I will explore the "enigma" of machine creativity, challenging the misconceptions about the "inferiority" of machines works. Finally, I will discuss the element of intent as a factor in originality and authorship. I will argue that, given current developments in computer-generated works, intent should be deemed irrelevant for establishing originality.

This chapter also provides the basis for my concluding arguments in Part IV, which is the final part of my dissertation.

3.4.1 Framing Originality

3.4.1.1 The Legal Standard

The standard of originality goes back a long way. Vaver provides that for a work to be considered original it must "(a) originate from its author, (b) not be copied, and (c) involve more than trivial or mechanical intellectual effort."[1356] Novelty "in the sense of the patent law is not required."[1357]

[1354] Abbott, Everything is Obvious, *supra* note 806 at 27.
[1355] The US Feist creativity approach to originality, though promising, still does not provide sufficient reasoning. Regrettably, SCOTUS has not taken the necessary leap forward in developing the concept of creativity, which is vital to the originality standard. The SCC ruling in *CCH* represents an important step in the right direction.
[1356] Vaver, *supra* note 237 at 100. Except where the work is so simple that the expression and the idea are merged. See *Morrissey v Procter & Gamble Co*, 379 F (2d) 675 (1st Cir 1967); Durham, *supra* note 939 at 622: "If there is only one way, or a few ways, to express an idea or to communicate a fact, so that exclusive rights to the expression would effectively preempt the idea or the fact, then 'merger' is said to apply and the expression is uncopyrightable."
[1357] Vaver, *ibid*; See e.g. *Medforms Inc v Healthcare Management Solutions Inc*, 290 F (3d) 98 (2nd Cir 2002); *Urantia Foundation*, *supra* note 1020; See also Nimmer, Nimmer On Copyright, *supra* note 1253 at § 2.01[A] (2-7): "Although in some early copyright cases, the distinction was not recognized, it is now clearly established, both as a matter of congressional intent and judicial construction, that the originality necessary to support a copyright merely calls for independent creation, not novelty […]." Nimmer further explains that "originality in the copyright sense means only that the work owes its origin to the author … is independently created, and not copied from other works." Nimmer, Nimmer On Copyright, *ibid* § 2.01[A] (2-9).

Creativity[1358] is an important criterion, though its importance varies by jurisprudence. Bridy explains that "[a] work is creative if it embodies some modest amount of intellectual labor."[1359]

The originality debate is divided into two main factions: supporters of the UK's "sweat of the brow" (and much pre-*Feist* US's) criteria on the one hand, generally represented by Lockean labour theory; and those supporting the creativity-oriented criteria on the other.[1360] Between these two, the SCC has chosen a third way, commonly known as the "skill and judgment" approach.[1361]

From a natural rights perspective, the requirement of originality is one that "merely reflects the premise that copyright ought to protect the personality of authors as expressed in their work."[1362] According to this view, there is no justification for copyright protection without traces of personality. The utilitarian perspective, on the other hand, justifies the protection of works that would have not been produced without providing incentives to authors to create.[1363] These incentives are usually reflected by the financial benefit ("copyright tax") to authors from acquiring their creations for a limited time. However, as Bently and Sherman observe, the legal tests for originality "do not reflect with precision any particular theoretical perspective", though it seems that they have influenced the development of the originality standard.[1364]

Seeking a common ground for originality might be deemed unnecessary, excruciating, and perhaps impossible. Even under the current standard, Litman explains, applying originality is very

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1358 Without creativity, there can be no work of art. See e.g. *Gardenia Flowers Inc v Joseph Markovits, Inc*, 280 F Supp 776 (SDNY 1968). This depends on what one means by "creativity".
1359 Bridy, *supra* note 423 at 16.
1360 Creativity-oriented criteria are inspired both by SCOTUS (*Feist*, *supra* note 440) and the EU's *Software Directive*, *supra* note 641 at art 1(3) (the author's own intellectual creation).
1361 Craig, *supra* note 489 at 104. Vaver, *supra* note 237 at 100 explains further that "[t]he intellectual effort required for originality implies skill and judgment in expressing an idea, namely, using one's 'knowledge, developed aptitude or practised ability' to decide how to produce a work from among available options. Mere industry or 'sweat of the brow' is not enough; nor is creativity necessary."
1362 Bently & Sherman, *supra* note 406 at 95.
1363 *Ibid*.
1364 *Ibid* at 96.

difficult.[1365] However, adopting a common originality standard has its advantages. First, a generalized standard will contribute to coherence among different nations and states, "both horizontally (treating different works according to a single standard) and vertically (in creating a coherent relationship between standards of infringement and subsistence)."[1366] Second, delving into originality deliberations may create a better standard and have a bearing on the ongoing debate concerning the balance between an author's rights and the public domain (as reflected by the struggle between the "sweat of the brow" and creativity approaches). Drassinower further offers that the common standard for originality takes balance into account; however, "balance is both insufficient and counterproductive as a category grounding the transition" (*i.e.*, from labour to authorship).[1367] Third, the current low and vague standard for originality is no longer acceptable: "[T]he concept of originality is a poor substitute for tangible boundaries among parcels of intellectual property because it inherently unascertainable."[1368]

Originality could serve as the "valve" for AI copyright. From a normative perspective, copyright bars should be decided on merit – an objective standard as Yanisky-Ravid and Velez-Hernandez suggest – and not on conceptual beliefs that deny AI *any* legal rights. By adopting a consistent standard for originality, we may develop a better system for allocating rights on that basis.

1365 Litman, *supra* note 994 at 975: "the principle of limiting copyright protection to only those aspects of a work that are original with its author, while remarkably easy to state, proves to be impossible to apply."
1366 Bently & Sherman, *supra* note 406 at 99.
1367 Drassinower, *supra* note 442 at 57. Drassinower suggests that the current model of copyright protection (the "balance model") is insufficient, stating that "both Feist and CCH propose the transition in the name of balance. Yet balance is both insufficient and counterproductive as a category grounding the transition." *Ibid* at 219. Drassinower argues for the development of a new model – the dialogue model – which, "by contrast, centers its attention on the distinction between a thing (whether tangible or intangible) and an act. It sees copyright as juridical protection of the integrity of an author's choice whether to publish or not. Its starting point is thus the specificity of a work of authorship as a communicative act." *Ibid* at 225-6.
1368 Litman, *supra* note 994 at 1004.

The originality standard might serve another purpose as well. The principal test for machine intelligence is the Turing test, which aims to distinguish between humans and AI or robots by assessing the responses of the test subject to given questions. The originality standard can piggy-back on this test, using it as a creativity standard to seek out whether it is possible to differentiate between human and AI creations. If the test cannot ascertain which is which, it might serve to strengthen the AI's authorship claim.

Highlighting several key assumptions is important. First, this discussion assumes copyright law would retain its current principles, at least in the short run – an assumption scholars have challenged. In a world without copyright, no originality standard is needed. Further, the originality standard might be weakening under the no authorship model I have suggested and maybe even become irrelevant.

Second, under the AI authorship model, in which the AI is recognized as the author, the originality standard would either become as important as today or, as I suggested, more important. Third, under any other model – programmer, user or AI authorship – machine creativity is an essential element in the authorship discussion and should be addressed properly.

3.4.1.2 Original and Inconsistent

Originality is a multicultural standard with different colours and tones across continents and states. The basic structure and substance are similar, but on the creativity scale, there are variations. The US, the UK, the EU, Canada, and Israel reflect these changes. Thus, I will briefly describe each state's originality model. This discussion opens the way to the following chapter in which I will further develop the concept of creativity.

The US *Copyright Act* of 1976 states that "copyright protection subsists … in original works of authorship."[1369] In the *Trademark Cases*, SCOTUS "limited 'writings' as found in the Copyright Clause in the US Constitution to 'only such as are original and are founded in the creative powers of the mind'."[1370] In *Burrow-Giles Lithographic Co v Sarony,*[1371] SCOTUS further defined copyright as "the exclusive right of a man to the production of his genius or intellect."[1372] In *Burrow-Giles*, the court constructed a broader definition for the concepts of "author" and "writing", stating that writings mean the literary productions of those authors and "include all forms of writing, printing, engravings, etchings, etc., by which the ideas in the mind of the author are given visible expression."[1373]

Hence, an "author" is one "to whom anything owes its origin; originator; maker; one who completes a work of science or literature."[1374] The landmark decision of *Burrow-Giles* shaped the legal boundaries of authorship and established the "dichotomy between creative work and

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[1369] *Copyright Law of the United States*, *supra* note 627 § 102(a). Yanisky-Ravid & Velez-Hernandez, *supra* note 1348 at 24, observe that "the congressional intent behind the Copyright Act was to leave the originality concept undefined in order to clear the path for courts to maintain their existing standards of originality."

[1370] Bridy, *supra* note 423 at 9. See *The Trade-Mark Cases*, 100 US 82 (1879) at 94: "The ordinary trademark has no necessary relation to invention or discovery. The trademark recognized by the common law is generally the growth of a considerable period of use, rather than a sudden invention. It is often the result of accident, rather than design, and when under the act of Congress it is sought to establish it by registration, neither originality, invention, discovery, science, nor art is in any way essential to the right conferred by that act. If we should endeavor to classify it under the head of writings of authors, the objections are equally strong. In this as in regard to inventions, originality is required. And while the word writings may be liberally construed, as it has been, to include original designs for engravings, prints, &c., it is only such as are original and are founded in the creative powers of the mind. The writings which are to be protected are the fruits of intellectual labor, embodied in the form of books, prints, engravings, and the like. The trademark may be, and generally is, the adoption of something already in existence as the distinctive symbol of the party using it."

[1371] *Burrow-Giles*, *supra* note 715.

[1372] *Ibid* at 54-60: "Plaintiff is a lithographer, and defendant a photographer ... [T]he plaintiff … under an agreement with Oscar Wilde, became and was the author, inventor, designer, and proprietor of the photograph in suit, the title of which is Oscar Wilde … and that said plaintiff made the same at his place of business … [F]rom his own original mental conception, to which he gave visible form by posing the said Oscar Wilde in front of the camera, selecting and arranging the costume, draperies, and other various accessories in said photograph, arranging the subject so as to present graceful outlines, arranging and disposing the light and shade, suggesting and evoking the desired expression, and from such disposition, arrangement, or representation, made entirely by the plaintiff, he produced the picture in suit."

[1373] *Ibid* at 58.

[1374] *Ibid*.

mechanical labor" in the US.[1375]

In *Bleistein,*[1376] *Alfred Bell & Co v Catalda Fine Arts Inc*,[1377] and *Ansehl v Puritan Pharmaceutical Co*,[1378] the originality standard "reached a low watermark."[1379] In *Bell*, the court explained that "an 'original' in reference to a copyrighted work means that the particular work *'owes its origin' to the 'author'*. No large measure of novelty is necessary,"[1380] even in a situation in which the author would depart substantially from the paintings and this diversion would be inadvertent – the new work would be copyrightable: "A copyist's bad eyesight or defective musculature, or a shock caused by a clap of thunder, may yield sufficiently distinguishable variations."[1381]

In *Ansehl,* the court relied on Justice Holmes' opinion in *Bleistein*[1382] and concluded that a work "requires very little originality, indeed, to render proposed advertising matter copyrightable … The tendency of the modern cases is to increase rather than to restrict the subject matter of copyright." The court then quoted Copinger's Law of Copyright,[1383] stating that "the artistic work

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1375 Bridy, *supra* note 423 at 11. Bridy further explains that "according to the court's reasoning … the machine taking the picture mediated but neither negated nor co-opted the process of artistic production, which could be traced quite directly back to the governing consciousness and sensibility of the photographer, the person behind the lens who posed the subject just so and altered the lighting just so."
1376 *Bleistein, supra* note 1018.
1377 191 F (2d) 99 (2nd Cir 1951). In *Bell* the court argues about whether the mezzotint engravings of a famous painter are, by itself, copyright protected (*i.e.*, not only a mere copy of the paintings). The court reflects on the "originality" of those engravings.
1378 61 F (2d) 131 (8th Cir 1932).
1379 Bridy, *supra* note 423 at 13-4.
1380 *Bell*, *supra* note 1377 at para 1.
1381 *Ibid* at para 2.
1382 *Bleistein*, *supra* note 1018 at 251: "Again, the act, however construed, does not mean that ordinary posters are not good enough to be considered within its scope. The antithesis to 'illustrations or works connected with the fine arts' is not works of little merit or of humble degree, or illustrations addressed to the less educated classes; it is 'prints or labels designed to be used for any other articles of manufacture.' Certainly works are not the less connected with the fine arts because their pictorial quality attracts the crowd, and therefore gives them a real use – if use means to increase trade and to help to make money. A picture is nonetheless a picture, and nonetheless a subject of copyright, that it is used for an advertisement ... It would be a dangerous undertaking for persons trained only to the law to constitute themselves final judges of the worth of pictorial illustrations, outside of the narrowest and most obvious limits."
1383 (6th ed, 1927).

must be 'original', but this means no more than that the work must not be copied from another artistic work of the same character."[1384]

These decisions contributed to the confusion surrounding the originality standard in the US. The task of shaping originality and providing essential clarity ultimately fell to SCOTUS in *Feist Publication, Inc v Rural Telephone Service Co.*[1385]

Feist is considered the most important and influential decision in the US on the concept of originality (and maybe even copyright), "hailed both as a landmark decision and a legal 'bomb'."[1386] In *Feist,* the court considered whether the white pages of a telephone directory[1387] – or any such compilation of facts – are original and thus deserve copyright protection. The court clarified that "original, as the term is used in copyright, means only that the work was independently created by the author (as opposed to copied from other works), and that it possesses at least some minimal degree of creativity."[1388] Justice O'Connor relied heavily on the *Burrow-Giles* definition of the author as the person to whom we owe the origin of a work.[1389] However, SCOTUS extended the originality definition of *Burrow-Giles* to include creativity, even if only a minimal degree.[1390]

[1384] Copinger, *supra* note 936 at 75. It should be noted that there were other cases that required a higher standard for originality. See *Baltimore Orioles Inc v Major League Baseball Players Association*, 805 F (2d) 663 (7th Cir 1986). Bridy, *supra* note 423 at 16. Bridy further offers that in this case, "the Seventh Circuit echoes Bell's conclusion that novelty in the patent sense is not required in copyright law; however, the court pointedly teases apart the concepts of originality and creativity, thus departing from Bell's unitary focus on originality and its conflation of two discrete constitutional requirements into a single criterion." Bridy, *ibid* at 17.

[1385] *Feist*, *supra* note 440.

[1386] Gervais, *supra* note 440 at 961.

[1387] A telephone directory in which the names, phones and addresses are arranged in a simple (orthodox) alphabetical order.

[1388] *Feist*, *supra* note 440 at 345.

[1389] *Ibid* at 346; Durham, *supra* note 939 at 583.

[1390] *Feist*, *ibid* at 363: "As a constitutional matter, copyright protects only those constituent elements of a work that possess more than a de minimis quantum of creativity." In addition, SCOTUS also opined that stating facts does not deserve copyright protection, *Feist*, *supra* note 440 at 347-8: "It is this bedrock principle of copyright that mandates the law's seemingly disparate treatment of facts and factual compilations. 'No one may claim originality as to facts.' ... This is because facts do not owe their origin to an act of authorship. The distinction is one between creation and

Under UK copyright law the originality bar is very low. The *CDPA* provides that "copyright is a property right which subsists … in the following descriptions of work – (a) *original* literary, dramatic, musical or artistic works."[1391] Hence, establishing originality requires that the work of the author is not a copy and that the work will be "the result of [the author's] 'labour, skill and judgment'" and constitutes an individual's effort.[1392] The UK's originality standard does "not require original or inventive thought, but only that the work should not be copied and should originate from the author."[1393]

Bently and Sherman explain that "the amount of 'labour, skill, and judgement' must be 'substantial' – or at least not trivial."[1394] However, labour *by itself* cannot satisfy the originality standard and "it is clear that the reason why tracing and photocopying do not produce original works is not that there is no labour; rather, it is that it is not the right type of labour."[1395]

In *Walter v Lane,*[1396] the House of Lords granted copyright protection to a note-taking process because it "required an 'industrious collection' effort."[1397] In *University of London Press Ltd v University Tutorial Press Ltd,*[1398] the court gave a basic, ambiguous definition of originality which required an author only to prove that the work is not a copy of something else. In *Sawkins v Hyperion,* the court stated that "a work need only be 'original' in the limited sense that the author

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discovery: the first person to find and report a particular fact has not created the fact; he or she has merely discovered its existence. To borrow from Burrow-Giles, one who discovers a fact is not its 'maker' or 'originator.'… The same is true of all facts – scientific, historical, biographical, and news of the day […]."

1391 *CDPA*, s 1(1). There is no need for originality in entrepreneurial works (films, sound recording, broadcasts and typographical arrangements).

1392 Bently & Sherman, *supra* note 406 at 93; Dorotheou, *supra* note 423 at 85-93. See e.g. *Ascot Jockey Club Ltd v Simons*, [1968] 64 WWR 411, 56 CPR 122 (BCSC); *Ladbroke*, *supra* note 743.

1393 *Ibid*, quotes *Bookmakers Afternoon Greyhound Services Ltd v Wilf Gilbert (Staffs) Ltd*, [1994] FSR 723 (Ch D.).

1394 Bently & Sherman, *ibid* at 97. See also *Merchandising Corporation v Harpbond*, [1983] FSR 32.

1395 Bently & Sherman, *ibid* at 98.

1396 [1900] AC 539 (HL (Eng)) (discussed under "author" and not "original"); See also *Morris v Ashbee* (1868) LR 7 Eq 34, and *Kelly v Morris* (1866) LR 1 Eq 697 as quoted in Gervais, *supra* note 440, footnote 51.

1397 Gervais, *supra* note 440 at 958.

1398 *University of London Press Ltd*, *supra* note 743.

originated it by his efforts rather than slavishly copying it from the work produced by the efforts of another person."[1399]

The UK's "sweat of the brow" approach may not (and should not) endure foreseeable changes in copyright. As Vaver offers, "In deciding on originality, courts should realize the value judgment they are being asked to make: Has the author spent enough intellectual effort on the product to deserve protection from others' copying it for his lifetime and another fifty years beyond that?"[1400] I accede to Vaver's notion of intellectual effort. Copyright should be awarded, from a normative perspective, only to creators that show an intellectual effort in their work. Mechanical, "simple" works should not reward the creator copyright protection, and we should not regard such works as original under copyright law.[1401]

EU-UK relations were always difficult. ECJ's rulings – most significantly *Infopaq* – "illustrate a certain British resistance to accepting CJEU jurisprudence tout court."[1402] Though, as Bently and Sherman offer, in *Newspaper Licensing Agency v Meltwater*, UK courts were inclined to adopt the EU *Infopaq* ruling.[1403] Dorotheou views the situation differently, claiming that these decisions have not changed the UK treatment of originality, at least not yet.[1404]

With the coming Brexit, it remains to be seen whether the UK will retreat to its laxer originality standard, adopt the EU model or formulate a new standard to bridge the differences

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1399 [2005] 1 WLR 3281 at 3288.
1400 Vaver, *supra* note 237 at 101.
1401 It is true that in recent decades, copyright protection has been granted to authors and creators for what might be regarded as "simple" mechanical work. I do not oppose such decisions. However, the law, copyright included, is a living, breathing creature and, as our technology evolves, the law should evolve as well. In this regard, I submit that the new originality standard should incorporate more creativity-oriented criteria.
1402 Ana Ramalho & Maria C Gomez Garcia, "Copyright After Brexit" (2017) 12 JIPLP 669 at 671; For a broader review on EU originality, see Rosati, *supra* note 750.
1403 Bently & Sherman, *supra* note 406 at 110-1; [2010] EWCA Civ 890 at paras 19-22.
1404 Dorotheou, *supra* note 423, refers to *Newspaper Licensing Agency Ltd v Meltwater* [2011] EWCA Civ 890.

between the EU and the UK.[1405] A return to the "skill, labour or judgment" standard "would depend as well on how UK courts will apply originality after Brexit."[1406]

Harmonization and integration among EU member states have always been considered a key objective in the EU's aspirations to constitute a *Eurotopia*,[1407] and "[d]uring the 1990s, it became clear that copyright was to play a pivotal role in this respect."[1408] Until not long ago, the development of copyright law was placed under the jurisdiction of the national law of each member of the EU.[1409]

Concerning copyright protection, many argue that originality should play a significant role in harmonization among EU members.[1410] However, there is no general standard for originality among members, and the originality concept varies between continental approaches and the UK's "labour, skill and judgment" standard.[1411]

The EU's *Software Directive* provides the general guideline for EU originality, stating that a computer program would be considered original if "it is the author's own intellectual creation."[1412] The *Database Directive* and the *Term Directive* address EU originality as well,[1413]

[1405] Ramalho & Gomez Garcia, *supra* note 1402 at 670.
[1406] *Ibid*. Graeme Dinwoodie and Rochelle Dreyfuss further argue that "it is possible that the U.K. courts would take the opportunity post-Brexit to depart from the 2009 *Infopaq* decision … [and] revert to a closed list of categories of protected works rather than the more generous open approach … This open approach might lead to copyright protection for controversial types of work such as perfumes; the U.K. could now resist any such evolution in protectable subject matter." See Graeme B Dinwoodie & Rochelle Cooper Dreyfuss, "Brexit and IP: The Great Unraveling" (2018) 39 Cardozo L Rev 967 at 971.
[1407] David Vaver, "Copyright in Europe: The Good, the Bad, and the Harmonized" (1999) 10 Austl Intell Prop J 186.
[1408] Rosati, *supra* note 750 at 1.
[1409] The relationship between the EU and its members is not in the scope of this paper. See e.g. Irini Stamatoudi & Paul Torremans, eds, *EU Copyright Law: A Commentary* (Cheltenham, UK: Edward Elgar Publishing, 2014).
[1410] Rosati, *supra* note 750 at 3.
[1411] Gervais, *supra* note 440 at 968.
[1412] *Software Directive*, *supra* note 641 at art 1(3).
[1413] *Database Directive*, *supra* note 1179 at art 3(1), states: "In accordance with this Directive, databases which, by reason of the selection or arrangement of their contents, constitute the author's own intellectual creation shall be protected as such by copyright. No other criteria shall be applied to determine their eligibility for that protection." *Term Directive*, *supra* note 1014 at art 6, states: "Photographs which are original in the sense that they are the author's own intellectual creation shall be protected in accordance with Article 1. No other criteria shall be applied to determine their eligibility for protection. Member States may provide for the protection of other photographs."

using similar terms to the one that the *Software Directive* uses, emphasizing the author's own intellectual creation. Reading the *Term Directive* in context brings Guadamuz to conclude that "not only does the author need to be human, the copyright work must reflect the author's personality."[1414]

In the landmark *Infopaq*[1415] decision, the ECJ, in reciting the *Software Directive*, held that this criterion applies to all types of copyright subject matter.[1416] *Infopaq* provides a gloomy prospect for EU AI authorship. By adhering to a higher originality standard (even compared to other EU members) that is based on the author's "own intellectual creation", it is less likely that computer-generated or AI works would be deemed original in the near future.[1417]

The ECJ has followed this decision in subsequent cases as well.[1418] In *Painer*, for example, the court clarifies the meaning of "author's own intellectual creation" by saying that "the author was able to express his creative abilities in the production of the work by making free and creative choices."[1419] In these cases, the ECJ has adopted a continental approach to originality based on the

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[1414] Guadamuz, *supra* note 422 at 178.
[1415] *Infopaq International A/S*, *supra* note 752.
[1416] *Ibid*. "[W]orks such as computer programs, databases or photographs are protected by copyright only if they are original in the sense that they are their author's own intellectual creation."
[1417] See, as an example, the UK decision stating that the EU standard has raised the originality standard: *SAS Institute Inc v World Programming Ltd*, [2013] EWCA Civ 1482.
[1418] See e.g. *Bezpečnostní softwarová asociace*, *supra* note 757; *Football Dataco Ltd*, *supra* note 755 at para 38.
[1419] *Painer*, *supra* note 753 at para 89. In *Painer*, the ECJ debated whether the *Term Directive* originality standard for photographs includes portrait photographers. In para 91, the court explains how the photographer could express creative choices: "In the preparation phase, the photographer can choose the background, the subject's pose and the lighting. When taking a portrait photograph, he can choose the framing, the angle of view and the atmosphere created. Finally, when selecting the snapshot, the photographer may choose from a variety of developing techniques the one he wishes to adopt or, where appropriate, use computer software." The phrase "free and creative choices" was further developed in *Football Association* at para 98. The court held that sporting events "cannot be regarded as intellectual creations classifiable as works within the meaning of the Copyright Directive." This means football games in particular since they "are subject to rules of the game, leaving no room for creative freedom for the purposes of copyright." Bently & Sherman, *supra* note 406 at 100-101, pungently remarks that "[w]hile no doubt, to anyone who plays or watches football, the claim that there is no 'creative freedom' because of the constrains provided by the 'rules of the game' may seem misguided (so that absence of copyright in football matches may need to be explained in some other way), the court is making the important point that where creative choice is highly constrained by rules or functional considerations, the resulting 'work' is unlikely to be original."

author's intellectual creation not only for subject matters defined in EU directives (such as computer programs, databases, or photographs) but for other creative works as well.[1420]

Under Canadian copyright law, the SCC determined in *CCH*[1421] that for a work to be considered original, the work "must be more than a mere copy of another work."[1422] However, the work does not need to be creative "in the sense of being novel or unique."[1423] Hence, copyright protection requires proving "an exercise of skill and judgment."[1424] The decision, as Vaver explains, "required an intellectual effort that involved the exercise of skill and judgment beyond the mechanical or trivial."[1425]

The concept of originality in Canada has shifted from the traditional "sweat of the brow" standard toward that of "skill and judgement."[1426] The SCC refused to side with "either school by invoking a vision of the purpose of copyright as a 'balance' between 'promoting the public interest' and 'obtaining a just reward for the creator'."[1427] However, former SCC Chief Justice McLachlin

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1420 Rosati, *supra* note 750 at 4.
1421 *CCH*, *supra* note 440. See Chief Justice McLachlin opinion at para 16: "I conclude that the correct position falls between these extremes [pure labour versus creativity]. For a work to be 'original' within the meaning of the Copyright Act, it must be more than a mere copy of another work. At the same time, it need not be creative, in the sense of being novel or unique. What is required to attract copyright protection in the expression of an idea is an exercise of skill and judgment. By skill, I mean the use of one's knowledge, developed aptitude or practised ability in producing the work. By judgment, I mean the use of one's capacity for discernment or ability to form an opinion or evaluation by comparing different possible options in producing the work. This exercise of skill and judgment will necessarily involve intellectual effort. The exercise of skill and judgment required to produce the work must not be so trivial that it could be characterized as a purely mechanical exercise. For example, any skill and judgment that might be involved in simply changing the font of a work to produce 'another' work would be too trivial to merit copyright protection as an 'original' work." *Tele-Direct (Publication) Inc v American Business Inc*, [1998] 2 FC 22, considered a reflection of *Feist*, *supra* note 440, in Canada, as stated by Gervais, *supra* note 440 at 973.
1422 *CCH*, *ibid* at para 16.
1423 *Ibid*.
1424 *Ibid*.
1425 David Vaver, "Copyright Defenses as User Rights" (2013) 60 J Copyright Soc'y USA 661 at 665. Vaver further explains that "[h]eadnotes, case summaries, and indexes qualified; minor editing and additions to the case reports did not."
1426 See e.g. Abraham Drassinower, "Canadian Originality: Notes on a Judgment in Search of an Author" in Ysolde Gendreau, ed, *An Emerging Intellectual Property Paradigm: Perspectives from Canada* (Cheltenham, UK: Edward Elgar, 2008).
1427 *Ibid* at 140. Craig, *supra* note 489 at 129, states that "the Court made a considered choice to avoid the term 'creativity', with its attendant civilian conceptions of authors' natural rights and its romantic connotations."

argued for a lower bar of originality than *Feist*, stating that "I would not, however, go as far as O'Connor J […] in requiring that a work possess a minimal degree of creativity to be considered original."[1428] The SCC might abandon the UK conceptual "sweat of the brow" standard but seems reluctant to "go all the way" in adopting the US creativity requirements.

Israel's originality standard inclines more toward *Feist* than *CCH*. Up until 2007, Israel's copyright law was governed by the UK 1911 *Copyright Act* and, thus, Israel was considered the last "colony" to operate under the jurisdiction and influence of British copyright laws.[1429] During that time, Israel's Supreme Court had taken an activist role that eventually shaped Israel's copyright perceptions; this enabled the formulation and adoption of a new *Copyright Act* and, subsequently, the departure from the imperial grip of the UK copyright regime.[1430]

In 2007, Israel's parliament enacted a new copyright law.[1431] The 2007 Act does not define originality, stating that copyright protection "shall subsist in … original works which are literary works, artistic works."[1432] Hence, the Supreme Court decisions that precede the 2007 Act are still the most relevant source for understanding originality under Israeli copyright law. Birnhack, Neil Wilkof, and Joshua Weisman provide that "[a]ccording to the case law, a work is only to be regarded as original if (i) it originated with the author (as opposed to being copied), (ii) it embodies the author's labor, and (iii) it is (minimally) creative. All three elements must be present."[1433]

In the landmark *Interlego* decision, the court rejected the "sweat of the brow" approach

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1428 *CCH*, *supra* note 440 at para 22.
1429 Zemer, Copyright Departures, *supra* note 1098 at 1054. See also Lior Zemer, "Authors and Users: Lessons from Outre-Mer'Mer" (2013) 25 IPJ 231; Michael D Birnhack, Neil J Wilkof & Joshua Weisman, "Israel" in *International Copyright Law and Practice*, *supra* note 1132 § 1[1][a] (reviewing the historical background of copyright law in Israel).
1430 For further reading see Zemer, The Fall of the Last Imperial Copyright Dominion, *supra* note 1429; Zemer & Gaon, *supra* note 1121.
1431 *Israel Copyright Act, 2007* [2007 Act].
1432 *Ibid* at art 4(a).
1433 *International Copyright Law and Practice, supra* note 1132 § 2[1][b][ii].

and adopted the US *Feist* model.[1434] Former Chief Justice Meir Shamgar held that original "means that the creativity is the fruit of the creator's intellectual effort, not that it is novel over existing works."[1435] In a later case, the court explicitly stated that Israel's copyright law "accepted [an approach that] conditions copyright protection on the presence of a minimal degree of creativity and rejects protection of a work based purely on labour. This approach is based on the leading rule established in the United States in *Feist*."[1436] Not only has the originality definition not changed upon adoption of the 2007 Act, but a recent Supreme Court decision has re-embraced the *Interlego Feist* ruling.[1437]

3.4.2 The "Enigma" Machine

3.4.2.1 The Concept of Creativity

The concept of creativity is important, perhaps essential, to the development of originality, and is actively debated.[1438] Recent attempts to define creativity, however, have not proven sufficient and, "[f]or more than a century, the threshold for creativity has purposefully been kept at a minimal level."[1439]

[1434] CA 513/89 *Interlego A/S v Exin-Line Bros SA*, 48(4) IsrSC 133 [1994].

[1435] Eran Liss & Dan Adin, *Intellectual Property Law and Practice in Israel* (Oxford: Oxford University Press, 2012) at 337.

[1436] CA 8485/08 *The FA Premier League Ltd v Council for Sports Betting* (25 January 2010) (Isr). See also CA 2790, 2811/93 *Eiseman v Qimron*, 53 PD 817 [2000] (Isr). For further reading see Niva Elkin Koren, "Of Scientific Claims and Proprietary Rights: Lessons from the Dead Sea Scrolls" (2001) 38:2 Hous L Rev 458.

[1437] CA 7996/11 *Safecom Ltd v Raviv* (18 November 2013) (Isr) at para 35 (Justice Yoram Danziger's opinion).

[1438] Helle Porsdam, ed, *Copyrighting Creativity: Creative Values, Cultural Heritage Institutions and Systems of Intellectual Property* (Surrey: Ashgate Publishing, Ltd, 2015); Mihaly Csikszentmihalyi, *The Systems Model of Creativity: The Collected Works of Mihaly Csikszentmihalyi* (New York: Springer, 2014); Joseph P Fishman, "Creating Around Creativity" (2015) 128:5 Harv L Rev 1333; Mandel, *supra* note 414; Silbey, The Eureka Myth, *supra* note 414; Eva E Subotnick, "Originality Proxies: Toward a Theory of Copyright and Creativity" (2011) 76 Brook L Rev 1487; Drassinower, *supra* note 442.

[1439] Boyden, *supra* note 714 at 380.

We consider a work creative "if it embodies some modest amount of intellectual labor."[1440] Determining a "modest amount" is harder than it seems, though. Maybe we should apply Justice Stewart's approach to obscurity, to creativity: "I know it [creativity] when I see it."[1441]

Margaret Boden observes that while we could disagree "about whether some ideas, or person, is creative" it would be hard to deny that "creativity does, sometimes, happen[s]" though how it happens is puzzling.[1442] In seeking to define what is creativity, "[w]e shall see that creativity is not a single ability, or talent, any more than intelligence is. Nor it is confined to a chosen few."[1443] Indeed, defining creativity is difficult, as "creativity is not the same as novelty. A work may be indistinguishable from its predecessors, but still creative and original, so long as the similarity is 'fortuitous, not the result of copying'."[1444]

Developing creativity as a legal concept, as Nimmer suggested, "is purely a matter of policy."[1445] Shaping the concept of originality by adopting a higher creativity standard might be the right move, but we must approach the issue with caution, keeping in mind Justice Holmes's warning in *Bleistein* that "it would be a dangerous undertaking for persons trained only to the law to constitute themselves the final judges of the worth of pictorial illustrations […] At the one extreme, some works of genius would be sure to miss appreciation."[1446]

Creative ideas, as stated by Kaufman and Sternberg, "must represent something different, new or innovative", be "of high quality", and be "appropriate to the task at hand or some

[1440] Bridy, *supra* note 423 at 16-7.
[1441] *Jacobellis v Ohio*, 378 US 184 at 197 (1964).
[1442] Margaret A Boden, *The Creative Mind: Myths and Mechanisms* (London: Routledge, 2004) at 11.
[1443] *Ibid* at 22.
[1444] Durham, *supra* note 939 at 584. *Feist*, *supra* note 440 at 345.
[1445] Nimmer, Nimmer On Copyright, *supra* note 1253 § 2.08[B] (2-84).
[1446] *Bleistein*, *supra* note 1018 at 251. See also Zahr K Said, "Reforming Copyright Interpretation" (2015) 28 Harv JL & Tech 470.

redefinition of that task."[1447] Robert Weisberg suggested we define creativity as "goal-directed", in contrast to Durham's[1448] argument for an accidental "clap of a thunder" creation, which cannot be defined as creative.[1449]

Gervais' approach to legal creativity is based on the author's creative choice, and "is not dictated by the function of the work, the method or technique used, or by applicable standards or relevant 'good practice.' Conversely, purely arbitrary or insignificant selection is still insufficient; a conscious, human choice still must be made, even though it may be irrational."[1450] As Gervais points out, however, one controversial element of the legal definition for creativity "is the exclusion of choices dictated by the function of the work. This, in fact, is very close to the test of 'practical inevitability' in *Feist*: if function dictates the course to be followed, there is no room for creativity."[1451]

Kwall's approach follows that of Gervais but taking a more practical path. Kwall recommends a statutory originality standard "that depends upon 'substantial creativity'",[1452] but exempts certain subjects that are typically "characterized by low levels of creativity, thus raising the bar in a transparent manner."[1453]

[1447] James C Kaufman & Robert J Sternberg, eds, *The Cambridge Handbook of Creativity* (New York: Cambridge University Press, 2010) at the preface; Elliot Samuel Paul & Scott Barry Kaufman, eds, *The Philosophy of Creativity: New Essays* (New York: Oxford University Press, 2014).
[1448] Durham, *supra* note 939.
[1449] Robert W Weisberg, *Creativity: Beyond the Myth of Genius* (New York: W H Freeman, 1993). See also Robert W Weisberg & Lauretta M Reeves, *Cognition: From Memory to Creativity* (John Wiley & Sons, 2013); Mihaly Csikszentmihalyi, *Creativity: Flow and Psychology of Discovery and Invention* (New York: Harper Collins Publishers, 1996).
[1450] Gervais, *supra* note 440 at 975. It is interesting to mention Gervais' views regarding the possibility of computer creativity. In his opinion, "the notion of creativity seems to be inexorably linked to the human mind. But what is creativity? The exercise of choice? Computers can and do 'choose' based on preprogrammed instructions; that does not make them authors."
[1451] *Ibid* at 977.
[1452] Roberta R Kwall, "Hoisting Originality: A Response" (2009) 20 DePaul J Art, Tech & IP L 1 at 8 [Kwall, Hoisting Originality].
[1453] *Ibid*.

Kwall's statement that an "originality determination should not be made to depend entirely on the judge's subjective perception",[1454] is in line with previous scholarship emphasizing the problems arising from judge's injecting personal creativity biases into decisions.[1455] In Kwall's words, "I would prefer to see an approach that is more nuanced and capable of greater creativity in application."[1456]

Joseph Miller presents another approach:[1457] Adopting patent law characteristics to define the creative segment of originality by "draw[ing] on patent law's non-obviousness requirement – with its focus on departure from conventional wisdom as the mark of a protectable invention – to dissolve the sterile dichotomy between near-total abdication and orthodox aesthetics that Holmes posed in *Bleistein*."[1458]

Michael Madison's approach to copyright is a mechanism for disseminating and producing knowledge.[1459] He argues that "as creativity law, copyright is oversold. The ubiquity of copyright and the ubiquity of creativity suggest that society has more creativity than it needs … copyright should be reconsidered as a species of knowledge law."[1460]

As already introduced, Parchomovsky and Stein's creativity model aims to "calibrate[…]s authors' protection and liability to the originality level of their works."[1461] Under it, "authors of highly original works will not only receive greater protection, but will also be sheltered from

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[1454] *Ibid*.
[1455] Bridy, *supra* note 423; Craig, *supra* note 489 at 23-4: "According to Keith Aoki, the court's conclusion [in Koons' ruling] resulted from the polarisation of the parties in light of a particular vision of worthy authorship […]."
[1456] Kwall, Hoisting Originality, *supra* note 1452.
[1457] Miller, Hoisting Originality, *supra* note 1350.
[1458] *Ibid* at 463.
[1459] Michael J Madison, "Beyond Creativity: Copyright as Knowledge Law" (2010) 12:4 Vand J Ent & Tech L 817 at 824: "Although creativity should not be excluded from copyright, copyright should be conceived primarily as a system for producing, distributing, conserving, sharing, and ensuring access to knowledge." See also Jenny L Sheridan, "Copyright's Knowledge Principle" (2015) 17 Vand J Ent & Tech L 39.
[1460] Madison, *ibid* at 820.
[1461] Parchomovsky & Stein, *supra* note 427 at 1507.

liability if sued for infringement by owners of preexisting works."[1462]

In *Feist,* SCOTUS opined that establishing creativity "seems to require not just 'work of the brain' but an exercise of the imagination – the formation of a mental conception ultimately given tangible expression in a work of authorship."[1463] Creativity appears, rather, to require some "work of the brain," or "intellectual labor".[1464]

Feist's creativity concept might also hint at novelty. In *Feist*, a telephone directory was found to lack creativity for being "entirely typical", "garden-variety", and "an age-old practice, firmly rooted in tradition and so commonplace that it has come to be expected as a matter of course."[1465] The court added that establishing creativity requires a "spark of creativity" that might be "crude, humble or obvious".[1466] Criticizing the "spark" requirement, Clifford suggests that "creativity does not usually represent a startling break-through of new thoughts as, more often, it results from the reworking of pre-existing ideas and facts."[1467]

The court in *Feist* appeared reluctant to provide a clear definition for creativity, stating that "originality is not a stringent standard; it does not require that facts be presented in an innovative or surprising way" and that "the selection and arrangement of facts cannot be so mechanical or routine."[1468]

[1462] *Ibid*. "Conversely, creators of minimally original works will receive little protection and incur greater exposure to liability if sued by others." It should be noted, however, that these early notions might already be true in the UK. See e.g. the seminal case of *Kenrick v Lawrence (1890)*, [1890] 25 QBD 99 at 103-4: "[A]lthough every drawing of whatever kind may be entitled to registration, the degree and kind of protection given must vary greatly with the character of the drawing, and that with such a drawing as we are dealing with the copyright must be confined to that which is special to the individual drawing over and above the idea - in other words, the copyright is of the extremely limited character which I have endeavoured to describe."
[1463] Durham, *supra* note 939 at 585.
[1464] *Feist*, *supra* note 440 at 347.
[1465] Durham, *supra* note 939 at 619.
[1466] Bridy, *supra* note 423; *Feist*, *supra* note 440 at 345.
[1467] Ralph D Clifford, "Random Numbers, Chaos Theory, and Cogitation: A Search for the Minimal Creativity Standard in Copyright Law" (2004) 82:2 Denver U L Rev 259 at 290 [Clifford, Random Numbers].
[1468] *Feist*, *supra* note 440 at 362.

While the court distinguished the US's approach to creativity – maintaining its importance in the originality equation – from the UK's "sweat of the brow" doctrine. *Feist* does not, however, take the necessary extra leap to establish what creativity *is*, making it "virtually impossible to discern […] where on the spectrum between the surprising and the routine to locate the break between eligible and ineligible subject matter."[1469]

Feist stated that creativity is important for establishing originality[1470] but was reluctant to define creativity beyond general remarks. It seems that the court only ended "the long division among federal circuits concerning the protection under copyright of factual compilations."[1471] Clifford argues, for example, that following the decision, courts misinterpreted *Feist's* language by "expecting a level of creativity worthy of Beethoven before the work will pass intellectual creativity."[1472] Canada's Supreme Court in *CCH* tried to provide a clearer path to creativity but with little success. The SCC's originality definition explicitly omitted requirements for creativity, leaving "skill and judgment and the omission of labour … to activities performable only by humans.".[1473]

In Part IV, I will offer my thoughts regarding the AI authorship standard. At this point, my vision for an AI authorship model includes creativity as an important criterion, in contrast to *CCH*.

[1469] Bridy, *supra* note 423 at 19. Bridy further provides that "Feist's unequivocal rejection of the routine and the mechanical does, however, implicitly place the work that machines do beyond the copyright pale, reinforcing the longstanding assumption from Burrow-Giles that purely mechanical labor is per se not creative." For further scholarly critiques of Feist's lack of creativity requirements see e.g. Leo J Raskind, "Assessing the Impact of Feist" (1992) 17 U Dayton L Rev 331 at 334; Madison, *supra* note 1460.
[1470] Bridy, *ibid* at 20, explains: "It is not enough for … a work to be original only in the sense that it was not copied from another work. The court makes at least that much clear by casting creativity as a necessary (even if ultimately ineffable) component of originality."
[1471] Gervais, *supra* note 440 at 951.
[1472] Clifford, Random Numbers, *supra* note 1467 at 289.
[1473] Perry & Margoni, *supra* note 779 at 7; *CCH*, *supra* note 440.

3.4.2.2 Creative Machines

Creative machines pose significant challenges for originality. Any AI authorship standard would require establishing if interactions with machines could produce "a pattern of output that would be considered creative or original if done by a human being."[1474]

This part discusses a machine's ability to *express* creativity. I do not address other intriguing questions such as a machine's ability to *appreciate* creativity. This argument belongs to earlier parts where I discussed the Turning test.[1475]

Machines and other computer programs are generating content – music, artwork and literature – that, would likely be considered original if produced by humans. Current originality standards, however, label machine creativity as inferior, slavish versions of human works. As Ginsburg and Budiardjo argue, "[n]o machine is itself a source of creativity … Every unanticipated machine output arises directly from some human instruction programmed into the machine."[1476]

Machine creativity could differ from human creativity and yet be creative itself. Furthermore, even in perceiving machine works today as unworthy of copyright protection lacking in creative design, future human perceptions might change to increase machine creation's value (as happened with human creators that were only appreciated years after they died).

The unequal treatment between machine and computer output is even more substantial in involuntary creations. The low bar for originality and creativity for human works was highlighted

[1474] *Intellectual Property Rights in an Age of Electronics and Information*, *supra* note 628 at 72.
[1475] Boden, *supra* note 1442 at 16-17, explores these questions as part of her three "Lovelace" questions: (1) "whether computational ideas can help us understand how human creativity is possible" (2) "whether computers (now or in the future) could ever do things which at least appear to be creative" (3) "whether a computer could appear to recognize creativity."
[1476] Ginsburg & Budiardjo, *supra* note 714 at 58. They further explain, at 58-9: "[T]he resulting output, even if unique and completely unpredictable, is the direct result of the machine's process, which, in turn, is inevitably the brainchild of some human developer or user."

in the US's *Bell* and Israel's *Qimron* decisions. In *Bell*, Justice Frank remarked that "[a] copyist's bad eyesight or defective musculature, or a shock caused by a clap of thunder, may yield sufficiently distinguishable variations."[1477]

In *Qimron*, Israel's Supreme Court granted copyright protection to Qimron's work – uniting and deciphering the pieces of the Dead Sea Scrolls – despite being no different from what a machine could do.[1478] Undoubtedly, the court would have reached a different outcome under current legal standards if the same process would have been performed by a computer.

Given expected developments in AI, we are likely to see more and more works that express random or involuntary creation without programmers dictating the parameters of such creation. These works would probably exhibit creativity, but I fear it would not be protected under the current standard of originality. As Boyden observes, computer-generated works with no human impact challenge copyright law in two ways: First, excluding a machine's creation from copyright protection goes against the non-discriminatory principle in copyright law: "copyright protection should not depend on judicial determinations of artistic merit."[1479] Second, there is no need to prove a connection "between acts of authorship and the creative elements present in the work."[1480]

Recognizing machine creativity could also hasten the forsaking of romantic perceptions about creativity since, "[i]f the source of creativity is superhuman or divine, or if it springs inexplicably from some special human genius, computers must be utterly irrelevant."[1481]

Bridy further explains that "[i]f we define creativity as a quintessentially human faculty,

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[1477] *Bell*, *supra* note 1377 at 105.
[1478] It could be argued that Qimron added no creativity, only knowledge. See *Qimron*, *supra* note 1436.
[1479] Boyden, *supra* note 714 at 390.
[1480] *Ibid*. The courts ask, "as a proxy for creativity, only whether the putative author engaged in expressive activity, making choices, or judgements, or using skill; if so, then the court simply presumes, as Justice Holmes suggested in Bleistein, that there is 'something' in the work, somewhere, that is copyrightable."
[1481] Boden, *supra* note 1442 at 16.

then computers can never be authors, and we can basically stop there. But if we define creativity alternatively as a set of traits or behaviors, then maybe creativity can be coded."[1482] Indeed, "creativity isn't a special faculty, possessed only by a tiny Romantic elite. Rather, it's a feature of human intelligence in general."[1483]

One of the reasons to avoid romantic perceptions about creativity is that, as with other human traits, we still do not understand human creativity. Many philosophers "argue that no naturalistic explanation of any of our psychological capacities is possible … In short, the philosophical respectability of 'strong' AI, and of cognitive science in general, is hotly disputed."[1484] Accordingly, arguments about creativity are difficult to prove.[1485]

I argue that we can – and should – accept that machines can *express* creativity. However, not all machine's (as not all human's) output can and should be described as creative. As with the "missing something" arguments that seek to exclude AIs simply because of their inability to possess human elements, we should avoid adopting similar arguments regarding intelligence and creativity.[1486] For example, when a program, like Microsoft *Excel*, "applies a known body of knowledge to solve problems with known solutions in a predictable fashion" it is not innovative or creative. However, when a machine "is given unpublished clinical data on patent genetics and actual drug responses, and tasked with determining whether a drug works for a genetic mutation in a way that has not yet been recognized" it should be considered innovative and creative and

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[1482] Bridy, The Evolution of Authorship, *supra* note 624 at 398.
[1483] Margaret A Boden, "Computer Models of Creativity" (2009) 30 AI Magazine 24.
[1484] *Ibid* at 33.
[1485] See e.g. Silbey, The Eureka Myth, *supra* note 414.
[1486] I presented these arguments in Part I chapter III(B). Wu, *supra* note 14 at 418-420. The "missing something" argument represent the search for consciousness, or a soul, as a requirement for personhood. And while an AI might be programmed to *stimulate* consciousness it would be difficult to determine if it is self-aware. Thus, as Wu, *ibid* at 420, offers, "[t]he relevant inquiry is whether self-awareness translates into the ability to create rather than merely reinterpret." I do not agree with these assumptions – self-awareness and other obscure elements should not become the legal basis for originally.

awarded legal protection accordingly, human or non-human alike.[1487]

Nancy Andreasen's long study on human creativity might help us understand creativity better.[1488] Andreasen sought to decipher this elusive mystery: What makes certain people more creative than others? Through brain scans and interviews, she examined creative people from different fields, which led to her establishing interesting conclusions about the creative human mind.

Andreasen outlined earlier studies on intelligence and creativity, including Lewis Terman's extensive IQ study.[1489] Although Terman's subjects grew up to become well established, having high salaries and a happy life, their high IQs did not predict high levels of creative achievement later in life. Only a few made significant creative contributions to society."[1490] Terman's study, reinforced by subsequent research, refutes the connection between intelligence and creativity: High intelligence does not have a significant effect on creativity.

Andreasen describes several alternative approaches to predicting creativity, in the absence of an intelligence-based explanation. First, is the "little c" approach: a quantitative assessment of creativity. The *little c* approach uses tests to score people's capacity to be creative. For example, subjects would be asked to answer the question, "How many uses can you think of for a brick?" A person would score high results if he or she came up with many different responses (which the l*ittle c* approach labels as a person with "divergent thinking"). Higher scores equal greater creative potential. Given the difficulties already discussed above in defining creativity, and that certain

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[1487] Abbott, Everything is Obvious, *supra* note 806 at 29.
[1488] Nancy C Andreasen, "Secrets of the Creative Brain" (July/August 2014), online: *The Atlantic* <theatlantic.com/magazine/archive/2014/07/secrets-of-the-creative-brain/372299>. See also Nancy C Andreasen, *The Creating Brain: The Neuroscience of Genius* (Dana Press, 2005).
[1489] Terman's study began in 1921 and consisted of 856 boys and 672 girls. His study is considered an important milestone in the human creativity quest.
[1490] Andreasen, *supra* note 1488.

assumptions about creativity must be accepted (for example that creativity can be measured using tests), the *little c* approach is a weak approach to creativity assessment.

Second is the "duck test" where "if it walks like a duck and quacks like a duck, it must be a duck". This approach relies on a selective group of well-established, creative and accomplished individuals. However, as with the *little c* approach, the duck test is facing criticism due to its inherent subjectivity. The duck test relies on personal taste and is time-sensitive due to evolving standards and artistic value. Further, creativity might vary between different fields (*e.g.*, creativity in the arts might not be equated with creativity in science or business).[1491]

In searching for human creativity, Andreasen finds that "creative people [from both groups – scientists and artists] have shown stronger activations in their association cortices during all four tasks than the controls have."[1492] Andreasen explains that creative people are autodidacts, polymaths, and persistent. Their creativity happens in unusual moments like an afternoon nap or a shower. Creative people also seem to have a broad interest in many fields and areas and are adventurous risk-takers.

Andreasen further establishes a connection between mental illness and creativity: "The creative subjects and their relatives have a higher rate of mental illness than the controls and their relatives do […] The most common diagnoses include bipolar disorder, depression, anxiety or panic disorder, and alcoholism."[1493] As Theseus said in Shakespeare's *A Midsummer Night's Dream* play, "The lunatic, the lover, and the poet Are of imagination all compact."[1494]

While Andreasen's studies explore human creativity, Boden focuses on machine creativity.

[1491] *Ibid.*
[1492] *Ibid.*
[1493] *Ibid.*
[1494] *A Midsummer Night's Dream*, Act 5, Scene 1.

Boden offers a roadmap for machine creativity by distinguishing between psychological (P) and historical (H) creativity.[1495] While *P creativity* "is one that's new to the person who generated it. It doesn't matter how many times, if any, other people have had that idea before", *H creativity* "is one that is P-creative and has never occurred in history before."[1496] For example, Harold Cohen's AARON program, which generates drawings, might be considered *H creative*.[1497] However, even if it does, it might still not be considered creative under copyright standards. As Ginsburg and Budiardjo explain in analyzing AARON's program: "[T]he ability of these machines to generate outputs 'on their own' does not justify the logical leap to the concept of "machine authorship'."[1498]

Machine creativity is inspired by the different ways in which human creativity occurs: combination, exploration or transformation. Combinational creativity means producing unfamiliar combinations of familiar ideas (creating collage or mimicry parrots). Exploratory creativity vests on "culturally accepted style of thinking, or 'conceptual space'," which "is defined (and constrained) by a set of generative rules" (style of painting or a national cuisine).[1499] Transformative creativity is altering the style or space by changing its defining elements, resulting in new ideas that could not be generated before. Boden prefers transformational creativity since "it can give rise to ideas that are not only new but fundamentally different from any that went before. As such, they are often highly counterintuitive."[1500]

Combinational creativity is most complex for machines. AI can make novel combinations

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[1495] Boden, Computer Models of Creativity, *supra* note 1483 at 23.
[1496] *Ibid* at 24. *i.e.*, novelty in patent law.
[1497] AARON is a computer-generated program that creates paintings with no specific instructions from its user (*i.e.*, AARON chooses what colors to use, what figures to paint *etc*.). Given that AARON can create unique painting, using colors that even its creator wouldn't use, it is considered *H creative*. Some of AARON's works are available online at Cohen's website <http://aaronshome.com/aaron/index.html>.
[1498] Ginsburg & Budiardjo, *supra* note 714 at 70.
[1499] Boden, Computer Models of Creativity, *supra* note 1483 at 25.
[1500] *Ibid*.

from existing data. But it is difficult to "generate and prune these combinations in such a way that most, or even many, of them are interesting – that is, valuable."[1501] The challenge is that machines or computer programs lack human's vast cultural and world knowledge that often is involved in the process.

AI could develop innovative algorithms, like The Deep Blue program that beat Kasparov or the AI program that won the Chinese Go game. But no AI system today has the vast knowledge, developed concepts and richness of a human being.

Explanatory creativity could be modified for AI if the relevant rules and styles are specified clearly on. Boden claims that in comparison to combinational creativity, explanatory creativity proved a greater success, as "the computer comes up with results that are comparable to those of highly competent, sometimes even superlative, human professionals."[1502]

Human scientists not only explored different fields and subjects, but also transformed these fields. Will AI be able to do that?

I share Boden's view that it is misleading to claim that computers can only follow strict programming code and instructions. A computer "can do only what the program *enables it* to do. But if its programmer could explicitly tell it what to do, there'd be no bugs – and no 'world-class' color prints from AARON surpassing the handmade productions of Cohen himself."[1503] By enabling randomness in its code and the ability to make changes, we could enable programs to exceed its original programming.[1504]

[1501] *Ibid*.
[1502] *Ibid* at 27.
[1503] *Ibid*.
[1504] *Ibid* at 29, describes potential changes: "These changes are similar to the point mutations and crossovers that underlie biological evolution. Many evolutionary programs also include a fitness function, which selects the best members of each new generation of task programs for use as 'parents' in the next round of random rule changing. In the absence of an automated fitness function, the selection must be made by a human being."

These changes and adaptations might not suffice to deem an AI creative, at least by human standards, but with progress in big-data and deep-learning, AI might develop ways to process different styles and vast knowledge,[1505] and subsequently, as Boden opines, a "program may include rules *for changing itself*."[1506] Ginsburg and Budiardjo, however, are not convinced. For them even the "more sophisticated 'learning' models which we may not precisely understand or supervise … does not change … [the] initial conclusion that machines are not 'creative'."[1507]

Boden, Andreasen, Abbott and others offer a broader view on creativity and intelligence and pose intriguing questions about developing creative AI and defining machine creativity. If we assume machine creativity might develop in a similar way to human creativity, then we might consider Andreasen's observations on creativity.

As I suggested, developing randomness and intuition in AI's codes might produce similar results in human creativity. Herbert Simon, for example, concluded that since humans and machines share a similar decision-making process, intuition could – theoretically – be programmed.[1508] For ethical reasons, we should not design AI with inherent mental illness, but we can try to impose certain traits associated with human creativity.

Progress might be achieved when AI can process data from a broader spectrum of sources developing what I described in Part I – artificial general intelligence. A different observation might

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[1505] David Levy explains the concept of randomness and free will: "Manifestly computer do make choices, but does this mean that they have free will? After all, the choices made by computers are often explicitly determined within a program. But some decision-making mechanism employed in programs are capable of the same type of flexibility as those evident in humans, incorporating a balance between predictable choices determined solely by logic expressed within a program and the unpredictable choice of randomness." David Levy, *Robots Unlimited: Life in a Virtual Age* (Wellesley, Ma: A K Peters, 2006) at 384.
[1506] Boden, Computer Models of Creativity, *supra* note 1483 at 29.
[1507] Ginsburg & Budiardjo, *supra* note 714 at 63.
[1508] Herbert A Simon, *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations*, 4th ed (New York: Free Press, 1997) at 139; Latar, *supra* note 32 at 23: "Whether we will be able to fully program intuitive processes and thus make an artificial brain that is as or more creative than the human brain still remains more if the realm of science fiction. A scientific answer will require scientific research of enormous scope."

result from studies about intelligence and creativity. It seems that even if AI can surpass the Turing test and other criteria for intelligence, that does not mean AI would become creative under Andreasen's terms; nor would it be able to achieve transformative creativity under Boden's terms. Further, even if we could develop random patterns in AI, the courts might be reluctant to award copyright to random creations anyway.[1509]

Alternatively, perhaps we should abandon the quest for creativity as part of the originality-copyright standard both for human and non-human alike, and focus more on the *process* rather than the outcome – leaving less room for human objectivities and artistic taste. In this regard, maybe the right approach is to incorporate patent law novelty and non-obviousness requirement in lieu of creative elements. I will further develop these ideas in Part IV.

The discussion I outlined in this chapter is fascinating, posing conflicting and intriguing issues concerning creativity. However, when addressing the legal boundaries of copyright law, which centred around the originality standard, one does not need to aspire for either Einstein's or Picasso's "eureka".

The legal definition for creativity is very limited and "a spark of creativity" – taking

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[1509] Bridy, *supra* note 423 at 11, explains, that SCOTUS was reluctant to establish whether random (unstaged) photographs can be considered for copyright protection; Durham, *supra* note 939. An interesting case is *Meshwerks Inc v Toyota Motor Sales USA Inc*, 528 F (3d) 1258 (10th Cir 2008). "Meshwerks insists that … its digital models of Toyota cars and trucks are sufficiently original to warrant copyright protection. Meshwerks' models, which form the base layers of computerized substitutes for product photographs in advertising, are unadorned, digital wire-frames of Toyota's vehicles." However, the court decided that Meshwerks' "photos" were not original and hence did not deserve to be protected under copyright law, holding that "digital modeling can be, surely is being, and no doubt increasingly will be used to create copyrightable expressions. Yet, just as photographs can be, but are not per se, copyrightable, the same holds true for digital models. There's little question that digital models can be devised of Toyota cars with copyrightable features, whether by virtue of unique shading, lighting, angle, background scene, or other choices. The problem for Meshwerks in this particular case is simply that the uncontested facts reveal that it wasn't involved in any such process, and indeed contracted to provide completely unadorned digital replicas of Toyota vehicles in a two-dimensional space. For this reason, we do not envision any 'chilling effect' on creative expression based on our holding today, and instead see it as applying to digital modeling the same legal principles that have come, in the fullness of time and with an enlightened eye, to apply to photographs and other media." Section C. See also Lee, *supra* note 1350 at 925-933.

SCOTUS' words in *Feist* – would satisfy originality in most cases and most countries. In other jurisdictions, originality could be established even with a smidgen of creativity or no creativity at all. However, this low creativity bar is for human creations only. Computer-generated and machines require a higher standard to be deemed creative. These approaches are not normatively justified, nor should we sustain these discriminatory standards for AI authorship.

3.4.2.3 Intentionality

On the outskirts of this discussion one issue remains – Should AI show intention in order to be deemed an author? And if so, how could we possibly prove AI intention exists? Wu suggests that intentionality is an important element for AI authorship: "If an AI cannot make value judgements … then perhaps something is missing."[1510] However, intention and randomness might not coexist. Thus, giving that randomness might prove important to AI creativity, the intent requirement for authorship should be reconsidered.

Lawrence Becker distinguishes between works of art and other labour that is not the product of an intellectual process. Becker suggests excluding "objects that we merely appropriate" (like picking strawberries), incidental discoveries or unintentional by-products (such as an unplanned child, Becker's example not mine).[1511] He suggests adopting a narrower conception for the mental elements that are involved in the labour process. A thing, Becker offers, can constitute authorship when it satisfies three conditions:[1512]

> *"(1) its causal history is traceable to (or through) the intentional states of an agent or agents; (2) those agents, in the process of making their causal contribution to producing the thing, are also creating or realizing their mental representations of it; (3) those*

[1510] Wu, *supra* note 14 at 422.
[1511] Lawrence C Becker, "Deserving to Own Intellectual Property" (1993) 68 Chicagio-Kent L Rev 609 at 613.
[1512] *Ibid*.

representations either constitute the artifact itself (as when the 'thing' is an idea), or play a substantial causal role in its production."

Under condition 1, natural objects are excluded, while conditions 2 and 3 rule out mere physical labour and fruitful accidents. Becker's conditions emphasize causality and intentionality as crucial elements for authorship, which are determined by the agent's intentions and eventual mental representations.[1513]

Following the Israel Supreme Court's decision in *Qimron*, Nimmer offered to distinguish between intent to create a work and intent to create a work of authorship, arguing that only a work of authorship should be copyrightable.[1514] Intentionality, Nimmer explains, is a vital part for authorship: "Copyright protection arises only for works that reflect an intent to produce something personal or subjective. By contrast, works that are objective, whether in fact or as presented, fail to qualify as works of 'authorship' in the copyright sense."[1515]

Both Becker and Nimmer emphasize intent (or intent to create) as vital for establishing authorship. These positions, as I already explained, are difficult to reconcile with the current trends in machine creativity. Maybe in the future, AI will develop consciousness, which encompasses some level of intuition. However, this time might not come soon.

In his work, Zemer raises similar concerns regarding collective intentionality by the public.[1516] Zemer proposes observing the public "as having a collective intention to retain a right in every copyrighted entity."[1517] Indeed, any AI authorship model would have to either forsake

[1513] Zemer, *The Idea of Authorship*, *supra* note 526 at 83.
[1514] David Nimmer, "Copyright the Dead Sea Scrolls: Authorship and Originality" (2001) 38 Hous L Rev 1.
[1515] *Ibid* at 161.
[1516] Zemer, *The Idea of Authorship*, *supra* note 526 at 85: "[T]he question whether the public qualifies for the intent element which both Becker and Nimmer advocate, and which I accept."
[1517] *Ibid* at 86.

intent and causation requirements or shape its theories differently. As I already discussed, on the surface, it seems difficult to develop an AI creative program that would both perform randomly – which is an important element in developing machine creativity – and demonstrate intent.

Causation might prove to be even more difficult to determine. I criticized the *GDPR* for its "right to explanation" for machine-learning algorithms, which is somewhat dubious in wording.[1518] Many programmers expressed concern about these obligations, claiming that machine-learning programs are intended to be sporadic and thus explaining that the process is considered a significant challenge.[1519] If programmers cannot explain how the AI program achieved certain goals (as with the Chinese Go AI program) how can we prove causation for establishing authorship?

On the other hand, programmers might enable coding AI to aspire to create a work of authorship, *i.e.*, coding the program to *believe* it is an author. However, even if this is possible in theory, given AI's inherent "hive mind" and collective abilities (as I explained in Part I, we can

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[1518] *GDPR*, *supra* note 184, art 22 para 3, states that a data controller "shall implement suitable measures to safeguard … at least the right to obtain human intervention on the part of the controller, to express his or her point of view and to contest the decision", otherwise a person has "the right not to be subject to a decision based solely on automated processing." Sandra Wachter, Brent Mittelstadt and Luciano Floridi observe that the right to explanation is not required by the regulation: "Critically, a right to explanation is not mentioned … In all of the GDPR, a right to explanation is only explicitly mentioned in Recital 71, which states that a person who has been subject to automated decision-making: should be subject to suitable safeguards, which should include specific information to the data subject and the right to obtain human intervention, to express his or her point of view, to obtain an explanation of the decision reached after such assessment and to challenge the decision." Sandra Wachter, Brent Mittelstadt & Luciano Floridi, "Why a Right to Explanation of Automated Decision-Making Does Not Exist in the General Data Protection Regulation" (2017) 7 IDPL 76 at 79-80. However, Bryce Goodman and Seth Flaxman, suggest that "[t]he provisions outlined in Articles 13-15 specify that data subjects have the right to access information collected about them, and also requires data processors to ensure data subjects are notified about the data collected." Bryce Goodman & Seth Flaxman, "European Union regulations on algorithmic decision-making and a 'right to explanation'" (2017) 38 AI Magazine 6. However, in order to provide "meaningful information about the logic" (Article 13 para 2(f)) of the program, one must explain the *way* the program works and how the algorithms *process* the data. See also Sandra Wachter, Brent Mittelstadt & Chris Russell, "Counterfactual Explanations Without Opening the Black Box: Automated Decisions and the GDPR" (2018) 31:2 Harv JL & Tech 841.

[1519] Though recent research shown progress in explainable machine-learning, see e.g. DARPA's Explainable Artificial Intelligence (XAI) project. David Gunning, "Explainable Artificial Intelligence (XAI)", online: <darpa.mil/program/explainable-artificial-intelligence>.

assume that any AI will share its knowledge with other AIs), individual intent would be even more tricky (*i.e.*, to prove specific AI intention to create a work of authorship). Zemer's theory for collective public intentionality could, however, be applicable to AI's collective net.

PART IV: NEW VISION FOR AI COPYRIGHT

"We can only see a short distance ahead, but we can see plenty there that needs to be done" (Alan Turing)

4.1 THE AI AUTHOR

Who is the AI author? This question might be difficult to answer today. My dissertation offers several alternative paths to AI authorship. All are possible, and all could change the way we perceived our legal concepts and, subsequently, IP and copyright law. The AI author might turn to be very much like the human author: Expressing creativity in a similar manner and thus, as I have explained above, might be accorded the same legal protection as humans.

We should not expect changes to be abrupt and sudden. Every day we encounter new innovative inventions and every day our computers learn to do something new. The process might be slow or fast. We could reach singularity within the next five, thirty or hundred years. I do not wish to engage in the futuristic discussion, my research aims to outline not only the legal consequences of an AI author but also what might happen along the development way. As people say, sometimes the journey is more important than the destination.

Allocating legal rights to AIs for their creations seem unprobeable at our current stage of technological development.[1520] As Samuelson and others suggested, in searching for the right model for AI ownership, legal scholars offer several alternatives such as the AI user-authorship model, derivative works, or WMFH doctrines. I discussed the supporting reasons for adopting those models in Part III. I also explained why some of these models are better than others.

When I sat to write Part III, I had a very specific model for AI authorship in mind. At first, I thought computer-generated programs should be awarded authorship, albeit limited in scope, provided that its works are original and creative. I resented the fact that the concept of creativity

[1520] As Ginsburg & Budiardjo, *supra* note 714 at 57, recently observed: "[T]he concept of 'machine authorship' more reflects what we hope (or fear) artificial intelligence will eventually become than what it is today." This statement might be true. Nonetheless, I do not share Ginsburg & Budiardjo skepticism for AI-Authorship.

within copyright's legal standard is limited and, as a pro-public domain scholar, I thought that by awarding authorship to AIs, even early development of AIs (and subsequently limiting the programmer's and user's copyright), AI could also serve as a new social instrument for improving public access to works, music, and art.

That was a very optimistic vision. Delving into the scholarly papers, my ideas took a different path. Given that AI is a very general concept (as I explained in Part I), crediting any computer-generated work as an AI (or AI author) is not the right approach at present. There is a bridge we must cross, and there are differences we must settle between diverse ideals for copyright and different legal structures among many countries and jurisdictions.

There are, however, several conclusions to be drawn at that point. First, a programmer AI-authorship model is misguided and unwarranted – both from doctrinal and normative perspectives. There is no reason to provide programmers (or companies) the same copyright protection in their computer-generated or AI works. Programmers enjoy – and should continue to enjoy – patent rights (if eligible) for their creations and should be able to enjoy copyright protection for a limited time according to a more balanced model that takes the level of originality and sophistication of the program into consideration.

Second, a user-authorship model for the interim period in computer-generated and pre-AIs stages is a more reasonable and prudent approach. I share Samuelson's argument that the user is best positioned to deliver creations to the public and thus is more favourable for authorship at the current level of development. I also agree with Yanisky-Ravid's view on the importance of users in the next stages of development, which could serve as the "supervisors" of the AI program and thus more suitable for ownership, albeit partially.[1521]

Third, on a theoretical level, joint authorship models between the programmers and users might be applicable as well. However, on a practical level, I do not think this approach is warranted. As I explained in Part III, there are many challenges in applying the joint authorship model for user-programmer. If a joint model is indeed necessary or wanted – licences are a better legal mechanism to implement such collaborations.

Fourth, moral rights can serve as a supplementary legal mechanism to support AI authorship in the coming decade. I developed the moral rights model in Part II and III. I presented the advantages of assigning moral rights to AI or the computer programs on two levels. First, with computer-generated and AI automated creations (*i.e.*, with no human influence), a limited set of moral rights (like the right of attribution and the right of integrity) could prevent falsification or exploitation of the digital works. Second, on the next level of development, when AI is able to create independently and express some level of awareness and maybe even attachment to its creations, moral rights might be justified on a normative level as with human authors.

Fifth, even if we do concede to one or two alternative models for AI authorship, there might be still works that would not be fitted to those categories. However, this outcome should not be considered as wrong, since those "authorless" works would serve a different and important purpose – strengthening the public domain.

Indeed, the answer to the question of who the author is, might be "Its complicated". However, in bridging the legal history of computer development and IP we can provide some

[1521] Under Yanisky-Ravid's supervisory model, we can also limit the liability issues with AI infringements.

insights and predictions for the process of legal protection. As indicated, I share the understanding that we should not expect a significant shift in copyright within the next decade. Having stated that, I should also clarify that we should not read "significant" as "none". On the contrary, I expect changes which would establish that any non-human creation is indeed worthy of protection even if created with no human influence. I believe that – either through the courts or by the legislators – IP laws will recognize *any* computer-generated output (that is considered original under copyright laws) as copyrightable *per se*.

Ownership is a different matter though. I believe copyright laws should be amended to a user-favourable model, but I do not see that happening soon. I expect that in the coming years, the ownership model would remain pretty much the same. Eventually, however, a user-authorship model might be implemented as an interim legal mechanism for highly developed computer programs (though not yet AIs). This could happen in the next decade.

In a practical sense, I do not expect significant changes to the current legal protection for computer-generated output. This outcome is not desirable and should be challenged. One way to enable a more inclusive approach to computer-generated and AI creations is to implement a data policy that would enable uses of computer-generated creations for the public.

As I have outlined in Part III, data barriers expect to affect the development of AI and thus governments should consider exempting data for AI training purposes.[1522] However, any such policy should also make sure to provide public access to AI creations that were created with these data. A different result would further strengthen the major corporations, as well as limiting competition and innovation in the field.

[1522] IP Osgoode has recently advocated for creating a data exception in the *Copyright Act*. See IP Osgoode Submission, *supra* note 1089.

One possible solution I presented in Part III is to create a royalty-based system that can make sure that part of the revenue from AI companies and initiatives using the excepted data will benefit the public. However, tracking the data in the process might be very difficult and even unrealistic.

There are also other concerns with establishing a royalty-based system such as with limiting user rights.[1523] This is where new technologies might prove useful, as with the recent Earth Bank of Codes.[1524] The project is using blockchain technology to map and classify biological data from every species and animal in the Amazon basin, coding their genetic sequences using cryptography on the blockchain.

The blockchain data could be accessible to scientists and companies worldwide and, in theory, would enable the tracing of the data, thereby creating platforms for a fairer system of sharing and royalties. The Earth Bank of Codes project could be implemented on any data. Thus, for example, we could register books, songs, pictures and any kind of IP on the blockchain, creating a database for AI training purposes.

In the next chapter, I will further develop the AI standard. I believe that adopting a new standard for copyright protection would serve copyright law better. Indeed, it is important to differentiate between the different levels of development (*i.e.*, not any computer should be considered as an inventor or as an author).

[1523] As I have explained in Part III, Articles 11 & 13 to the proposed *Copyright in the Digital Single Market Directive*, *supra* note 1066, were heavily criticized for damaging the Internet community by limiting user rights and for stifle companies' ability to sample copyrighted data. Eventually, article 13 was rejected by the EU parliament.

[1524] See Earth Bank Codes, online: <earthbankofcodes.org>. Blockchain technology is based on blocks (lists of records) linked using cryptography (which is a sort of mathematical method to secure communication): "A blockchain is quite literally like a giant spreadsheet for registering all assets, and an accounting system for transacting them on a global scale that can include all forms of assets held by all parties worldwide." See Robert Herian, *Regulating Blockchain: Critical Perspectives in Law and Technology* (New York: Routledge, 2018) at Part I, blockchain. Blockchain should not be confused with Bitcoin, which is only one possible application of the technology. Blockchain provides numerous opportunities for both the government and the public sector.

4.2 FORMULATING AN AI STANDARD

Building upon the last three parts, and the previous AI Author chapter, my next step is to revisit the copyright standard. In Part III, I outlined the scholarly originality debate. I argued that two important changes ought to be implemented (not necessarily linked to AI). One is a higher originality and creativity-based standard; the second is bridging the originality gap between jurisdictions.

There are several challenges in formulating a new standard for copyright. I addressed some of those challenges earlier. However, there are also a few ideas presented recently that could provide further insights that might enable a new vision for authorship. Further, it seems somewhat likely that, without a higher originality bar, recognizing AIs as authors might create an imbalance in copyright law given that more works would be awarded protection, dwindling the works available for the public to enjoy.

4.2.1 Looking Back on the Doctrinal Challenges

As suggested in Part II, computer programs and copyright have never been a good match.[1525] In rethinking originality, we should distinguish between "simple" programs[1526] and highly complex and creative programs. Not all programs are the same and not all should be considered original under copyright law. Copyright protection for basic programs "is not only a poor fit doctrinally, but also in many ways normatively."[1527]

Tailoring the right legal mechanism according to the levels of ingenuity and sophistication would benefit developments in the field. In considering changes to copyright standard, we should

[1525] See the discussion in Part II, chapter III(A).
[1526] Programs that are created in a relatively short time, do not require much effort, and are technical in style and utilitarian (like program for mass production of cars) would not be considered highly creative.
[1527] Osborn, *supra* note 686 at 1341-2.

also account for the length of protection afforded to computer programs. I have suggested that the duration of copyright protection to computer programs should be limited. Further, we should also assign copyright for creative programs, even if the author or inventor of the program is not human.

Indeed, as several scholars have suggested through the 1970s and 1990s, copyright law might not be the best legal doctrine for computer programs. Stephen Breyer offers several reasons. First, a significant difference between the production cost and the cost of copying "is not alone sufficient to show that copyright protection is desirable."[1528] Second, the computer program industry is flourishing without IP protection.[1529] Third, no copyright protection is warranted due to the customized nature of programs, which were tailor-made for specific needs.[1530]

Samuelson shows that Breyer's conclusion is not far from the truth and most programs are developed in-house for custom users in modern times.[1531] It is also important to point out Breyer's claim that "much (but not all) systems software is now, and should continue to be, created by hardware manufacturers and sold along with their hardware at a single price."[1532] Many of these programs require "updates" and a user is "often buying services and expertise as much as he is

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[1528] Stephen Breyer, "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs" (1970) 84 Harv L Rev 281 at 344 [Breyer, The Uneasy Case for Copyright]. Justice Breyer revisits his 1970 paper in 2011 when he was invited to give a keynote speech. Stephen Breyer, "The Uneasy Case for Copyright: A Look Back Across Four Decades" (2011) 79 Geo Wash L Rev 1635 [Breyer, A Look Back Across Four Decades]. He remained loyal to his ideas, 1641: "The other thing I thought was fairly important is that people got mixed up in another way about why copyright existed and what the scope of protection is as a result. The original mixup, I think, started with King Dermott, who supposedly said, 'to every cow her calf.' Good point, as far as it goes. But many people somehow thought that could be their entire analysis of copyright. And you see that showing up even among the supporters of copyright term extension—people saying we own this work and therefore we have some kind of natural right to every penny that can be made from it. But of course no one else has that right. Teachers certainly do not; loads of people do not; hardly any worker does. And now I think that kind of logic is less prevalent."

[1529] Breyer, The Uneasy Case for Copyright, *ibid*.

[1530] *Ibid* at 345.

[1531] Pamela Samuelson, "The Uneasy Case for Software Copyrights Revisited" (2011) 79 Geo Wash L Rev 1746 [Samuelson, The Uneasy Case for Software].

[1532] *Ibid*.

buying a particular computer program."[1533] These conditions have not changed and are expected to become even more prominent in the future.

The long-term (and much needed) relationship decreases the necessity of legal protection. As Samuelson suggests, "If no one but the developer of such software ever has access to a machine-executable form of the program, copyright protection is arguably unnecessary."[1534] The characteristic mentioned above, along with the rapid progress of computer programs, which is probably only expected to become even more rapid in the future, weigh against the disproportionate length of copyright protection.[1535]

Setting aside the long-relationship subscription potential of computer-programs, there are also other technological measures that could secure programs in an effective way, making copying very difficult and, more importantly, not worthwhile. Contract law, trade secrets, patent law, and other technological means provide additional layers of protection.[1536] And, as Menell explains: "If these means of protecting research and development are inexpensive and effective, then legal protection may not be needed to ensure efficient provision of the good."[1537]

4.2.2 Alternative Models for Originality

My approach for a higher originality standard might seem like an attempt to nullify copyright protection for computer programs. It is not my intention. However, if eventually that would be the

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1533 Breyer, The Uneasy Case for Copyright, *supra* note 1528 at 345.
1534 Samuelson, The Uneasy Case for Software, *supra* note 1531 at 1779.
1535 See also Osborn, *supra* note 686 at 1341: "The rapid obsolescence renders the majority of the software's copyright term inconsequential: no one cares enough to copy the software after it useless."
1536 Though, as I explained in Part II, *Alice* made patenting (at least in the US) more difficult. I should also emphasize that I do not support strengthening trade secrets or contracts for computer programs protection. I only wish to argue that the current legal framework for computer programs offers extensive protection that might not be warranted. See Samuelson, The Uneasy Case for Software, *supra* note 1531.
1537 Menell, Tailoring Legal Protection for Computer Software, *supra* note 612 at 1339.

outcome, these programs probably should not have been protected under copyright law in the first place.

Copyright made sense in an era when programming was based, to some extent, on literature codes. With advancement in technology where most of the coding does not necessarily require actual "writing", this rationale might not prevail. Indeed, programming styles and methods are changing, and new environments "allow users to avoid directly typing virtually any code for some programs. Instead, they select icons that visually represent functions."[1538]

Formulating a new standard for copyright law requires a modular approach that would exclude simple programs (as well as mechanical "sweat of the brow" creations) from copyright protection. As I have explained, this does not mean that basic programs and slavish human works would not be *legally* protected – we could offer protection under a different legal mechanism like contract law and trade secrets. However, copyright protection should be reserved for creative creation only.

I am aware of the difficulties in establishing creativity. As many have argued before, we would not wish for judges to decide what is creative and what is not. Legal protection should not be determined by artistic taste. I am also aware that my proposal might borrow more elements from patent law's non-obviousness criteria for patentability.

A different argument is that my proposal *de facto* nullifies copyright law since it might not be worthwhile to claim or pursue copyright protection. Again, I agree that that eventually might be the outcome. However, formulating the perfect balance between what can, and should be, protected and what should not, and cannot, be protected is complex. In my dissertation, I only wish

[1538] Osborn, *supra* note 686 at 1356. This style of coding "abstracts the coding practice, removing it one or more levels from the literal code." Though Osborn is skeptical whether these expected changes will change court's decisions.

to point out several routes we could take to correct the flaws in our current legal framework. I am inclined to suggest a change in copyright law that would effectively exclude basic computer programs from copyright protection. Creative machine-learning algorithms and AI, on the other hand, would be able to copyright their creations if they meet the originality-creativity standard.

Maybe the time has come to revisit Menell's and Samuelson's suggestions for *sui-generis* protection for computer programs once more.[1539] Providing a thorough and detailed analysis of the economic and competitive implications that legal protection might have on the development of computer programs in the mid-1980s, Menell reached the conclusion that "there does not seem to be any economic justification for bestowing copyright protection on these products."[1540] He further suggests that "patent law is more appropriate" as a legal mechanism for protection of computer programs,[1541] arguing for "creating a hybrid form of patent protection specifically tailored to accommodate the market failures endemic to the provision of computer operating systems."[1542] Menell, too, is aware of the relatively short life span of computer programs, thus offering that the patent protection would be "shorter in duration than traditional patent protection."[1543]

Menell concludes that the hybrid patent protection would allow certain uses such as reverse engineering and "contain a flexible compulsory licensing provision."[1544] Menell wishes to promote innovation by adequately awarding protection for "truly innovative and useful operating systems." He further explains that limiting the scope of protection under certain conditions, like "moderate

[1539] Menell, Tailoring Legal Protection for Computer Software, *supra* note 612; Pamela Samuelson et al, "A Manifesto Concerning the Legal Protection of Computer Programs" (1994) 94 Colum L Rev 2308.
[1540] Menell, Tailoring Legal Protection for Computer Software, *ibid* at 1359.
[1541] *Ibid* at 1364.
[1542] *Ibid* at 1365.
[1543] *Ibid*.
[1544] *Ibid*.

duration, reverse engineering, adaptation – and the provision for compulsory licensing", would promote the industry.[1545]

Menell's statement that "legal protection should be significantly shorter in duration than traditional copyright protection" seems to support my earlier suggestion to limit copyright protection. And other suggestions to allow reverse engineering and compulsory licensing are compatible with Menell's belief that "[i]n order to realize the benefits of networks externalities and to promote creativity in the integration of software programs, it would seem worthwhile to allow limited access to application programs, particularly those that emerge as industry standards."[1546]

Indeed, as I have indicated in several parts, patent law might present a better model for a copyright standard for the next phase of technological development. In a recent paper, Abbott framed a new standard for patent law in the AI era which incorporates the expected changes in technology, making a new formula for both human and non-human patents – the inventive machine standard.[1547]

As with AI authorship, an inventive machine "should be one which generated patentable output while meeting traditional inventorship criteria."[1548] Abbott argues that the source of the invention is irrelevant – whether it came from a human or a machine. He further contends that "[h]aving inventive machines replace the skilled person may better correspond with real world

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[1545] *Ibid* at 1366.
[1546] *Ibid* at 1371.
[1547] Abbott, Everything is Obvious, *supra* note 806 at 33.
[1548] *Ibid* at 27.

conditions."[1549] Abbott explains that once highly advanced machines – like IBM Watson – replace the average worker, the average worker would become inventive.[1550]

In other words, when AI and highly advanced computers become the standard in the industry, capable of outperforming the human worker in any field, inventive machines would be the new standard, making the bar for obviousness higher in a way that simple machine and humans will no longer qualify as inventive.[1551] Given AI unlimited potential, everything might be obvious. And if everything is obvious, nothing can be patented.

Abbott's argument is based on two propositions. The first pushes for amending patent laws to recognize computers as inventors. Today, this approach is important to encourage the development of inventive and sophisticated AI computers, which serve the patent system. Given that under the current legal framework a computer-generated patent is not patentable (since we cannot register a computer as an inventor), it is important to consider amending patent law so that AI's programmers will be willing to invest the time and resources needed for the development of the field.

The second, which is intertwined with other scholarly debates, is that in the future we might reach the point where patents might not be required to facilitate inventions or creations since both humans and non-humans would not require incentives to create.[1552] This reasoning could apply to authorship as well. As machines produce more and more works, incentive theories might become less and less important.[1553] Other scholars have echoed this statement recently, arguing that "IP

[1549] *Ibid* at 29.
[1550] *Ibid* at 30.
[1551] *Ibid*.
[1552] *Ibid* at 39-40: "Once inventive machines set the baseline for patentability, standard inventive machines, as well as people, would generally be unable to obtain patents." Though, patent might still be desirable in certain industries and for development of certain products (like in the biotechnology and pharma industries).
[1553] I have addressed these arguments earlier in Part II, chapter IV(A).

law applies [to digital creations] less than many believe, and its incentive is less necessary than many would expect."[1554]

In challenging the copyright standard, Boyden offers a different alternative for originality. Boyden argues for using tort law principles in copyright law – mainly the concepts of causation and predictability. A person should be assigned authorship in a computer-generated or AI output only if he could predict or foresee the output based on the development of the concepts of negligence in tort law. Under Boyden's model, an author would be required to prove that "the output foreseeably includes a meaning or message that the author wishes to convey to his or her audience."[1555]

Like the foreseeability test in torts, establishing authorship would require assessing whether a reasonable person, "knowing what the putative author knew, would have tried to convey a given meaning to an audience through the computer program."[1556] The test should be "whether the putative author foreseeably communicated that meaning to the audience."[1557] A similar test was recently suggested by Ginsburg and Budiardjo to distinguish between upstream (*i.e.*, the programmer) and downstream (*i.e.*, the user) creators.[1558]

Boyden's suggestion is refreshing. His approach tackles one of the issues I addressed earlier, especially – the assigning of authorship (and copyright protection) of computer-generated works to the authors or owners of the program. Boyden's approach would strengthen the relation between the author or programmer and the work. In cases in which the author or programmer (or

1554 Osborn, *supra* note 686 at 1306. See also Lemley, IP in a World Without Scarcity, *supra* note 27.
1555 Boyden, *supra* note 714 at 393-4: "When it comes to torts, the necessary foreseeability for negligence liability is whether a reasonable person, knowing what the defendant knew, would have perceived the risk."
1556 *Ibid* at 394.
1557 *Ibid*.
1558 Ginsburg & Budiardjo, *supra* note 714 at 88. I have discussed their suggestin in Part III.

the designer) is able to explain the creation's *process* – he or she would be assigned copyright. However, Boyden's approach is limited to very specific computer programs and does not fit into my vision for a higher originality standard (as I do not think that simple creations – made by computers or humans – are worthy of copyright protection).

Further, AI technology is based on the unpredictability of the outcome. This excludes authors, programmers, or designers – who neither explain nor foresee the outcome of the process, thus making Boyden's model unsatisfactory for future technological developments which would incorporate machine-learning algorithms.

Even if creators do need "some appropriability mechanism to recoup their costs to maintain incentives to create", that does not mean that they necessarily need IP laws – contracts and other legal doctrines provide an alternative.[1559] In the coming years, the computer program market is expected to face many changes. We can expect that most programs will be automated, presenting a very simple and utilitarian model for computer programs. Other programs might be more complex and tailored made for specific organizations, sellers or individuals. We can also expect more machine-learning based programs that will be able to express some degree of creativity.

Lee presented a different approach to originality for the digital age. His suggestion could be applicable to AI and computer-generated works. Under Lee's new digital originality formula, a "work must be (1) independently (2) created, and (3) possess at least a modicum of creativity."[1560] Lee suggests bifurcating the phrase "independently created" (as in *Feist*) to emphasize individual contribution.[1561]

[1559] Osborn, *supra* note 686 at 1337.
[1560] Lee, *supra* note 1350 at 936. The digital originality test slightly diverged from *Feist* two stages test which bridged between independently and created.
[1561] *Ibid* at 937: "[T]he pairing of the two concepts has obscured the meaning each respectively contributes to the notion of independent creation."

This logic is actually better construed with earlier remarks concerning putting more emphasis on the process of the creation rather than the result in order to determine originality, as Lee noted, "Contrary to the analysis in *Meshwerks*, the independence requirement focuses on the process of what the person in fact did instead of the end product."[1562] This element of the test – "to highlight that the process of how the creator came up with the work is key"[1563] – is subjective.

The second part of Lee's test is creating a copyrightable work, meaning – a work that falls under copyright subject matter. This part of the test is objective and focuses on the product itself (*i.e.*, the outcome and not the process). As Lee further explains, although it seems that *Meshwerks'* work could be considered a work given the human influence in the process, this element of the test could face difficulties with AI and computer-generated works, given the legal barriers to AI authorship that I have discussed in earlier parts. [1564] In this regard, Lee's model is very limited in scope and does not offer an innovative approach for non-human creations.

The third and last part is the modicum of creativity, which is also objective and focuses on the product and not the process. In confronting the weaknesses in *Feist* – most noticeably *Feist's* reluctance to define what constitutes a creative "spark" – Lee draws some conclusions from the clues that *Feist* did provide for what *could not* constitute this spark: "(1) works that are so 'commonplace that it has come to be expected as a matter of course' and (2) works that are 'so mechanical or routine as to require no creativity whatsoever'."[1565]

Given that very few courts found works that actually fell below this threshold, Lee concludes that "courts need not engage in searching review for originality." He calls for the courts

[1562] *Ibid*.
[1563] *Ibid*.
[1564] *Ibid* at 945: "Had a computer program created entirely the wire frames of the Toyota car, the models arguably would not meet the second requirement of originality."
[1565] *Ibid* at 943.

to apply a "generous approach to the originality analysis" and suggests that "probing questions on the level of creativity involved in a work are avoided unless the work is of doubtful creativity."[1566] Lee's conclusion seems to correlate with that of other scholars I mentioned earlier, such as Subotnick.

4.2.3 Heightening Originality

Low creativity and inventorship standards serve IP law poorly.[1567] The alternative of raising the originality or inventorship bar is to establish that AIs are incapable of inventive or creative activity. The US Copyright Office, for example, has already ruled that non-human authors are not qualified for copyright protection.[1568] As I explained in Parts I & II, I believe that disqualifying AIs works and inventions produces dire outcomes for innovations, hindering the development of technology, which will result in fewer inventions and fewer creations for the benefit of humanity.

A different set of issues is whether raising the originality standard would benefit development in the AI field. While advocating for a higher standard might be considered reasonable for humans and AIs, some suggest that making changes to the copyright standard might cause more harm than good and would serve technological developments poorly.

Osborn suggests that changes in programming methods make programs less eligible for copyright protection. He explains that programmers rely more and more on "default structures to do much of the coding, with the programmer simply filling in the blanks."[1569] This programming

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[1566] *Ibid*.
[1567] Abbott, Everything is Obvious, *supra* note 806 at 42: "Failing to raise the bar for patentability once the use of inventive machines is widespread would significantly exacerbate this anticommons effect."
[1568] *Ibid*.
[1569] Osborn, *supra* note 686 at 1305. Osborn further explains the process, 1310: "The 'programmer' does not directly type the code, but rather selects icons that represents functions or selects from default structures based on commonly used features. The use then fills in certain parameters to actuate the function for her particular need."

process for utilitarian programs "highlights how little authorship occurs in the textual level."[1570] Osborn describes the copyright challenge in adapting these methods by comparing programming to cooking:[1571]

> *"If simple ordering choices could constitute sufficient creativity, then even simple listing of ingredients would qualify for copyright protection. After all, one could list flour first and eggs second or vice versa. One could alphabetize the ingredients or organize them by weight. And yet, we are told that mere listings of ingredients are not copyrightable."*

Adopting a higher originality standard, in the current level of computer development, might exclude these programs from copyright since the programmer's "work" is too simplistic and technical. Consider Qimron's work for example – a higher originality standard would no doubt have resulted in a different outcome in his case.[1572]

However, both doctrinally and normatively, adopting a higher originality standard might be the right approach after all. Several scholars have argued in favour of heightening originality. Diane Zimmerman, for example, views *Feist* as "half a revolution" given that "it neither gives us an originality standard with real teeth nor an explication of the core nub of copyright into which those teeth (were they to erupt) would be intended to bite."[1573]

Zimmerman argues that *Feist's* decision reflected the court's "dismay at the quantities of work of trivial merit that now receive lengthy and virtually airtight statutory protection."[1574] Harrison and Joseph Miller also express similar notions, sharing some commonalities with the

[1570] *Ibid* at 1310.
[1571] *Ibid* at 1322.
[1572] I discussed Qimron's case in Part III, see *Qimron*, *supra* note 1436 and the text near *supra* note 1478.
[1573] Diane L Zimmerman, "It's an Original!(?): In Pursuit of Copyright's Elusive Essence" (2005) 28:2 Colum J L & Arts 187 at 202.
[1574] *Ibid*.

non-obviousness requirement in patents. As I have argued earlier, non-obviousness could serve as an alternative mechanism for originality in the AI era.[1575]

Then again, perhaps we should forsake attempts to change the originality standard both for humans and non-humans, given Eva Subotnick's argument that, "courts are ultimately doomed to fail in the quest to explain, in a satisfying way, how a work of authorship is original in and of itself." [1576] Subotnick criticizes Miller's and Harrison's proposals, arguing that changing the legal standard for originality would result in raising the level of uncertainty in litigation and might distort artistic production.[1577] Subotnick suggests that under the current copyright laws, a court can only identify originality through "proxies for the legal concept."[1578] Her paper focuses on photographs but can easily apply to other works, computer-generated included. Given what Subotnick describes as "the courts' inability to reach originality in an unmediated fashion" and that a decisive account of the legal concept of originality is not within reach, the most practical approach is to leave the originality standard is it is.[1579]

Subotnick also tosses cold water on the idea of raising the originality bar to incorporate more creative elements, arguing that this change would only "result in greater manipulation of the proxies, determinations based on judicial subjectivity, and/or undesirable distortions of behavior

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[1575] See Miller, Hoisting Originality, *supra* note 1318 at 477: "Our experience with patent law's nonobviousness requirement suggests that taste is not the only measure of creativity. We can also assess creativity as a departure from that which is conventional, routine, or pedestrian. Rather than judge a work based solely on our own taste, we can judge a work by the ways in which the author's individual voice stands apart from conventional expression." See also the discussion near footnotes 1457 and 1350.
[1576] Subotnick, *supra* note 1438 at 1494.
[1577] *Ibid* at 1536-7. Subotnick explains, at 1537: "This uncertainty would result from an increased lack of predictability as to whether a work was creative enough to merit copyright protection at all."
[1578] *Ibid*. Subotnick identifies three such proxies: ontology, narrative and comparison. The ontology proxy reflects the courts reliance on an existent work, implying that the work is original "merely if it is not a copy and sidesteps the creativity requirement." The narrative proxy denotes the court's use of a plaintiff's authorial narrative to identify its work's originality, "translating" the visual work into a legal text. The comparison proxy reflects the court's method to establish originality by comparing between the work at issue to other works presented by the parties.
[1579] *Ibid* at 1495.

to comply with a legal rule."[1580] Heightening originality might also erode the potential income for creators from the low quality works they use to foster challenging creative works.

To put this argument in the AI context: If we raise originality, excluding basic computer programs and computer-generated works, we will decrease programmers' control and income from these works, making it more difficult to invest in more creative works. In other words, basic programs support highly creative and unorthodox programs.[1581]

Maybe we should focus more on the process rather than the outcome, leaving less room for human subjectivities and artistic tastes. In that regard, Justice Holmes's attempt in *Bleistein* to protect works "of little merit or of humble degree"[1582] under copyright laws effectively reduced courts' role as "artistic critics."[1583] As I have explained in Part III, *Feist*'s spark of creativity requirement did not prove to be of much use and, as Subotnick and others have argued, might only be used to "deny copyright protection to sufficiently creative works."[1584]

In considering early attempts to challenge originality in the digital era, the *Meshwerks*

[1580] *Ibid*. She further explains why, at 1528: "First, heightening the originality bar might distort artistic production or increase judicial tastemaking. Second, rigorous policing of the scope of protection to which a work is entitled can go a long way toward alleviating the need to raise the originality threshold. Finally, any proposal to heighten the originality requirement should take into account the complex ways in which creators and industries finance the production of original, creative works."
[1581] *Ibid* at 1549.
[1582] *Bleistein, supra* note 1018 at 251.
[1583] Subotnick, *supra* note 1438 at 1502: "The originality of a work under the *Bleistein* paradigm could be equated with its having originated with an author or, as Professor Diane Leenheer Zimmerman phrases it, 'if it is not copied, it is original'."
[1584] *Ibid* at 1507. See also Clifford, Random Numbers, *supra* note 1467 at 289-290. Clifford specifically stated that a higher degree of creativity, which *Feist* might promote, would result in the excluding of computer programs: "Rather than expecting a work to contain a 'minimal degree of creativity,' a significantly higher quantum of intellectual creativity is expected. What could be lost by this unrealistic expectation is that many of the average, mundane works that constitute a significant percentage of the expressive works developed and marketed will no longer be protected, making them economically unviable. Whether it is a typical computer program, a statue to be sold to a tourist, a dime-store novel, or a series of bingo cards, the way that the intellectual creativity requirement is being formulated in the lower courts is problematic for insuring that sufficient incentives are available for the authors of these types of works." As I have expressed earlier, this outcome is not necessarily unwarranted, at least for basic computer programs.

decision is probably one of the leading cases.[1585] Though the 3D digital art in *Meshwerks* is inferior to AI works; it is still presents exciting and challenging arguments to be considered as part of any attempt to reshape originality.

In short, *Meshwerks* created digital copies of Toyota's cars by taking the cars' measurements using a grid of tape that was processed to a computer. *Meshwerks'* employees "sculpted" the images on the computer, in what the court described as an extensive stage.[1586] In considering the new medium (*i.e.*, digital creation), the court concluded that "Meshwerks' models are not so much independent creations as (very good) copies of Toyota's vehicles."[1587] However, as Lee noted, the court's decision "is not a model of clarity" and its opinion "ambled between (1) originality cases involving photographs and (2) originality cases involving factual compilations."[1588]

There are several flaws in the court's decision. First, the decision seems to follow the unequal treatment of digital and computer-generated works as slavish copies.[1589] Lee further concludes that "[i]f the court's analysis were correct, then every realistic pencil sketch of objects in the world, such as the kind Leonardo da Vinci was famous for, could never qualify for copyright."[1590]

1585 *Meshwerks*, *supra* note 1509. For a more recent case, see *Home Legend, LLC v Mannington Mills, Inc*, 784 F (3d) 1404 (11th Cir 2015).
1586 *Ibid* at 1260-1: "Approximately 90 percent of the data points contained in each final model, Meshwerks represents, were the result not of the first-step measurement process, but of the skill and effort its digital sculptors manually expended at the second step." The dispute arose when *Meshwerks* claimed that Toyota infringed its terms of use for the wire-frame models. In defense, Toyota argued that *Meshwerks'* products lacked sufficient originality: "defendants argued that any original expression found in Meshwerks' products was attributable to the Toyota designers who conceived of the vehicle designs in the first place; accordingly, defendants' use of the models could not give rise to a claim for copyright infringement."
1587 *Ibid* at 1264.
1588 Lee, *supra* note 1350 at 927.
1589 *Ibid* at 928. Lee pointed out that Toyota's car could not be considered copies simply because "[i]t is a car – an uncopyrightable useful article." He later explains, at 944, that "[t]he court based this reasoning on the mistaken premise that realistic depictions of things in the world are somehow impermissible 'copies' under *Feist*."
1590 *Ibid* at 929-930.

In equating digital modeling with photography, Lee argues that even if there are similarities in the end product, the process is different: "[D]igital modeling of wire frames involves extensive measuring, computer modeling, and then human sculpting of data points that may require considerable human input, skill, and judgement […]."[1591] Moreover, using photography cases as the leading approach for digital originality would have resulted in a different outcome, given that "the prevailing approach is that virtually any photograph – even from an automatic, point-and-shoot camera – satisfies the originality requirement […]."[1592]

In the more recent case of *Home Legend*, the Eleventh Circuit reached a different conclusion concerning another digital work – the "Time Crafted Maple" design. *Home Legend's* design is a digital copy of wooden planks that were selected and moulded to give an old "time-worn" look. Like in *Meshwerks*, following the digital adaptation, Mannington's employees made changes to the processed images. However, in *Home Legend*, the court distinguishes *Meshwerks,* stating that "by contrast, the evidence shows that Mannington did not have another *work* in mind. At most, it had in mind a genre: rustic flooring. It created a digital artwork in that genre. The creative work was all Mannington's."[1593]

I find *Home Legend* more convincing and befitting to the user-authorship model that I have suggested. If anything, these decisions only reflect the challenges that courts and legal scholars are facing when applying copyright laws to new technologies.

[1591] *Ibid* at 931.
[1592] *Ibid*. I believe this conclusion is true under *Feist*, and even more so under *CCH*. As for the EU approach, which is more human-oriented, I find it difficult to ascertain to which direction the courts might turn.
[1593] *Home Legend*, *supra* note 1585 at 1410-1411. The court further explains, at 1411: "And even if copyright did not protect the altered individual plank images, the Glazed Maple design is more than that. It is a compilation expressing original selection and creative coordination of elements. A compilation even of uncopyrightable elements is eligible for copyright protection."

4.3 CONCLUDING REMARKS

My dissertation sought to discuss AI implications for IP and copyright law. In Part I, I outlined the main issues and historical developments of AI technology, as well as addressed the conceptual challenge of the AI concept. In Part II, I further developed the theoretical IP discussion framing possible routes for AI-IP theory. Part III provided the central thesis for my dissertation considering the different models for AI authorship and discussing copyright standards for originality. In this part, I revisited some of my earlier ideas and questions, building upon my arguments and providing some considerations and conclusions regarding AI authorship.

My dissertation is only the first step of a long journey to understand machine creativity and AI better within a theoretical discussion in IP law. I have only aspired to provide possible directions, as well as to point out both the opportunities and the difficulties that would result from any suggested changes to IP laws. As I have already stated, I have faith in the competency of the copyright legal framework to withstand the coming storm. I also believe that there is so much more we can do to amend flaws in our legal systems.

Indeed, the pace of technology is often too fast for our legal structures to adapt. Both the legislators and the courts are often too slow in making required changes. However, this is precisely what is expected from us in academia – to point out what ought to be changed and to voice our concerns offering alternative solutions. I hope my research was able to do this, albeit partially.

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